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CONTENTS.

Part		Page
I.	Parallax Investigations on 163 Stars, Mainly of Large Proper Motion. By William L. Elkin, Frederick L. Chase, and Mason F. Smith	1
II.	Parallax Investigations on 35 Selected Stars. By William L. Elkin, Frederick L. Chase, and Mason F. Smith	209
III.	Parallax Investigations on 41 Southern Stars, Mainly of Large Proper Motion. By Frederick L. Chase, and Mason F. Smith	327
IV.	Catalogue of Yale Parallax Results. By William L. Elkin, Frederick L. Chase, and Mason F. Smith	385

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ERRATA. — VOL. II.

PAGE	LINE	
8	35	After β Cygni add Weisse 17^h, 322 last series.
	38	After β Cygni add Weisse 17^h, 322 last series.
12	3	In column headed "B. D." insert 2.
13		In column headed "Scale Value Correction" 10th number should be −0.001.
15	3	For +20°, 88 read +21°, 88.
19	3	For +5°, 130 read +5°, 120.
51	2	For +51°, 1074 read +51°, 1076.
65	2	For +31°, 1756 read +31°, 1757.
	6	For 1893 read 1892.
66		In column headed "Def." for last number insert 2.
74		In last normal equation for 27.48 read 43.26.
88	8	For .83 read .832.
111	3	For +1°, 2968 read +2°, 2968.
122	2	For 8.3 read 8.4.
129		Under "Equations of Condition" change the first four and last four coefficients of y as follows: −1.52 to −1.54, 1.51 to 1.52, 1.49 to 1.50, 1.42 to 1.40, −1.53 to −1.56, 1.45 to 1.44, 1.42 to 1.40, 1.40 to 1.38. These corrections produce no appreciable change in the normals below and do not alter the value of y.
130		Under "Equations of Condition" change the coefficients of y for the middle group as follows: −1.64 to −1.72, 1.63 to 1.70, 1.59 to 1.65, 1.53 to 1.57, 1.47 to 1.48. With these corrections the normals in y become $+1.87\,x + 32.24\,y + 18.12\,z = +0.270$ and +0.415 and the solutions give for π +0.″125 instead of +0″.127 and +0″.168 instead of +0″.170.
145		Under "Temp.," 9th number, for 6.5 read 36.5.
169		Under "Distance a," 7th number, for 34.016 read 34.116. The solution following is therefore wrong but has been corrected on page 295.
179	1 and 2	Values of R. A. should be interchanged.
193		In second table, 2d column, last number, for ±0.145 read ±0.122. This results from the correction of page 169.
195	3	For +0.14 read +0.10. For 0.03 read 0.01.
	14	For 0″.036 read 0″.033.
	16	For ±0″.017 read ±0″.016.
196		For parallax of 4th star, 54 Piscium, read +0.12 for +0.14.
		For probable error for 6th star read .076 for .088.
		For probable error for 9th star read .050 for .056.
197		For probable error for 6th star read .049 for .055.
		Interchange probable errors for 31st and 32d stars.
		For probable error for 50th star read .064 for .073.
198		For probable error for 19th star read .066 for .076.
		For parallax of 39th star, Lal. 43492, read −0.05 ±.057 for +0.14 ±.065.
		For probable error for 43d star read .070 for .081.
		Note: The corrections to the probable errors just cited arise from the correction on page 193.
200–204		There are also slight errors in each table resulting from the above-noted corrections to 54 Piscium and Lal. 43492, but these have all been corrected in the formation of our final table given on page 383.
236	4	For 8.4 read 7.8. For 21 7.6 read 21 7.7.
279	11	After "Method" insert a.
289	11	For +0.127 read +0.125.
	12	For +0.170 read +0.168.
292		Lalande 46650, for Mag. 8.9 read Mag. 8.7.
293		Lalande 46650, for Mag. 8.9 read Mag. 8.7.
322		Under "Obs." for the star Weisse 21^h, 97 for S. 33 read E. 11 S. 22.

Transactions of the Astronomical Observatory of Yale University.

RESEARCHES WITH THE HELIOMETER.

PARALLAX INVESTIGATIONS ON 163 STARS

MAINLY OF LARGE PROPER MOTION.

BY

FREDERICK L. CHASE,
ASSISTANT ASTRONOMER,

MASON F. SMITH, AND WILLIAM L. ELKIN,
ASSISTANT, DIRECTOR.

CONTENTS.

		Page
§ 1.	Introduction	5
2.	Method of Observation and Reduction	6
3.	Observations and Results for 163 Stars	9
4.	Observations of Red Stars for Color Effect	184
5.	Discussion of the Results	192
6.	General Conclusions	199

PARALLAX INVESTIGATIONS

ON ONE HUNDRED AND SIXTY-THREE STARS

MAINLY OF LARGE PROPER MOTION.

§ 1. Introduction.

In the year 1892, as the work on the Parallaxes of the Stars of the First Magnitude by Dr. Elkin was drawing to a close, and Dr. Chase had completed his Triangulation of the Group in *Coma Berenices*, it became a matter of consideration in what line the observing work with the Yale Heliometer could most profitably be directed.

As stated in Dr. Elkin's report for that year, it finally seemed that it would be a promising task to undertake a reconnaissance survey, so to speak, of all the rapid moving stars within our reach and not hitherto attacked, with view to singling out those which are near enough to show a measurable parallax. It was at first thought that a small number of observations, say three or four, at each of two successive epochs of maximum parallactic effect would, with the known proper motions applied in the reductions, certainly show if the parallax amounted to as much as 0″.20 and would give some indication if it were as large as 0″.10. Any evidence of a large parallax was to be followed up by a more exhaustive investigation.

This project was taken up in that year, and by 1895 measures had been made upon 99 stars with proper motions exceeding 0″.5 a year, and not fainter than magnitude 8.8, all but two of which were observed at two epochs of greatest parallax effect, generally on three nights at each. Of these Dr. Chase, in addition to series on β *Cygni* and Algol, interest in the former of which had been awakened by Dr. Jacoby's results from the Rutherfurd plates and in the latter by Dr. Chandler's theory of orbital motion for this variable, had observed 86, and Dr. Elkin 13.

On examination of the results depending upon two epochs it seemed desirable, in view of the possible large preponderance of systematic error in so limited a number of observations

and appreciating the importance of a complete elimination of the effect of proper motion, to extend the observations through two more epochs taken in the reverse order, before drawing any conclusions. And it was further thought that the plan thus extended would furnish not only evidence of a parallax, but a pretty fair approximation to its value. At the same time a few additional stars were taken to fill up gaps.

Owing to Dr. CHASE's absence in Europe during the year 1896, and a period of ill health of Dr. ELKIN since 1897, and also the devotion of a considerable portion of our time to meteor photography, the completion of the programme required a longer period than was anticipated. Moreover in 1898 and 1899 Dr. CHASE devoted some time to making an investigation on a number of red stars for the detection of a possible systematic error due to star-color, and in 1899 and 1900 he made supplementary series on the two stars for which the solution indicated a parallax as large as 0″.20.

Again in 1901 Dr. DEBALL of Vienna proposed a co-operative plan for a stellar parallax campaign based upon stellar magnitude, to be carried out with the Repsold Heliometers, and we undertook to observe a number of the stars he had selected. Mr. M. F. SMITH, having taken up work with the Heliometer, completed a number of the series which had been begun by Dr. ELKIN, and Dr. CHASE, in addition to making a three epoch series on *Nova Persei*, finished the remainder. In order to fully occupy the time other stars of large proper motion were added to the list.

Finally in 1902 it was considered of high interest to take up Arcturus, for which the parallax hitherto found is surprisingly small in view both of its brightness and large proper motion, with as complete elimination of systematic error as possible. Three series have been undertaken by Dr. CHASE, and three more by Mr. SMITH; this work is still in progress, so that it is not yet possible to derive definitive results.

The results presented in this volume fall therefore into the following categories: —

	CHASE	CHASE ELKIN	SMITH	SMITH ELKIN	ELKIN
Stars with proper motion over 0″.4	117	5	13	12	10
Other stars proposed by DEBALL	11	–	1	1	–
β Cygni, Algol, *Nova Persei*	5	–	–	–	–
Red Stars, for color effect	6	–	–	–	–
Total number of series	139	5	14	13	10

The great bulk of this work has therefore been executed by Dr. CHASE, who has devoted to it the larger part of the past thirteen years. Mr. SMITH's contribution is about double that of Dr. ELKIN, so that the relative shares of the three observers are about as ten to two to one respectively.

§ 2. METHOD OF OBSERVATION AND REDUCTION.

In this investigation the results are made to depend wholly on measures of distance, position angle observations having been found to be far less accurate. In most cases two

comparison stars were selected, on opposite sides of the star whose parallax is under investigation, in the direction of maximum displacement by parallax, and as nearly as possible equidistant from it, and the observations made in as symmetrical a manner as possible, as described in Dr. ELKIN'S researches on the Parallaxes of Stars of the First Magnitude. For a number of stars, however, no suitable pair could be found, and a single comparison star at a moderately small distance was employed, the observations being made in conjunction with those of some other star near by, which would furnish the determination of the scale value.

The reversing prism eyepiece of power 210 has been employed throughout the work, thus rendering the observations free from any systematic personal error depending upon the direction of the stars from each other, or difference in color or brightness. In using it the head is always kept in the same apparent position relative to the star images, — namely, so that the direction of motion in "swinging through" is at right angles to the line connecting the observer's eyes, and each pointing is then repeated with an apparent reversal of the images through 180 degrees, which should eliminate any personal tendency in bringing together always to place the brighter or more highly colored image to the right or left of the other image. Whenever there was a marked difference in the brightness of the stars, the effort was made to equalize them to within half a magnitude by the use of wire gauze screens placed over one or the other of the semi-lenses.

The registering micrometer was used. The principal error in the micrometer screw was eliminated by having in the micrometer two pairs of fixed wires half a revolution of the screw apart, and using alternately one and then the other pair in the successive pointings. The index error of the scale is of course eliminated by making two more like pointings in the reversed position of the semi-lenses.

To eliminate further any progressive change in the measures which might be due to a changing scale value, some error in the refraction tables, or any other cause varying with the time, the measures were made in the customary symmetrical order, — distance (from) a, distance b, distance b, distance a, a and b designating the two comparison stars. A complete observation of any star thus consists of four distance measures, each of four pointings.

For each star by the programme finally adopted there were in most cases twelve such complete observations. A comparison of the mean results for the several epochs furnished an approximate value of the effect of proper motion; after the measures were corrected for this the sums of the distances gave by their divergences from their mean the scale value correction required each night to reduce all the measures to the same standard. The differences of the distances corrected for proper motion and for temporary scale value give twelve equations of condition of the form —

$$x + by + cz = n,$$

where x represents the required correction to an assumed value of this difference, y the parallax, z the necessary correction to the assumed annual proper motion, both relative to

the comparison stars, and n the difference between an assumed mean difference and the value deduced from each night's observation. The parallax coefficient was derived from an extended set of tables giving the parallax factors in right-ascension and declination.

In the few cases where only one comparison star was employed the same general explanation applies, except that the corrections are applied to the single distance instead of the difference of two distances, the temporary scale value being assumed to be the same as that found from the sums for another star in the same vicinity.

In the case of *β Cygni* two pairs of comparison stars were employed, two on each side of the main star, the correction for temporary scale value was determined from the sum of all four distances, and the difference between the half-sum of the two distances on each side of the star was used. Otherwise the treatment is exactly like the foregoing and the results comparable. As a further test of the accuracy of any resulting parallax, the fainter component of *β Cygni* was observed on the same nights from the same comparison stars, care being taken to make the two series together in a symmetrical order.

In the series on *β Persei* two pairs of comparison stars were used, but the second pair was selected more for the purpose of determining the proper motion of Algol than for furnishing any additional data for deducing the parallax, the position angles being nearly at right angles to the major axis of the parallax ellipse. Being of less importance, the distances of this pair were observed but once each night instead of twice, and in the solution for parallax these measures have been given only half weight.

In the series on *Nova Persei* the distance between the comparison stars, not being beyond the range of the Heliometer, was also measured each night, with the idea at first that it would furnish an independent determination of the scale value and so permit also an independent solution for the parallax from each comparison star separately. A closer investigation later, however, showed that this method would involve the parallaxes of the comparison stars in essentially the same manner as the method usually employed. But to have all the work comparable in every respect the plan of observation begun was continued, and simply as a matter of curiosity a second solution was carried out in the manner indicated, giving precisely the same result.

For the star Groombridge 2305 on one side two comparison stars were taken, the treatment being similar to that of *β Cygni*, whereby very symmetrical conditions were secured.

On April 29, 1901, the reading of the focal scale was redetermined and set at 10.90 mm. from 10.50 mm., where it had stood since 1885. This was done just before the DeBall stars were begun and before the extended list was taken up by Chase and Smith. This change therefore affects only the series on *Nova Persei*, *β Cygni*, and those stars which were commenced by Dr. Elkin and not completed until subsequently to the above date. In these cases a correction proportional to the change in apparent focal length was applied to the earlier measures, except for *β Cygni*, where the later measures were corrected.

§ 3. Observations and Results for One Hundred and Sixty-Three Stars.

The various data for each star are collected in the following pages, which as a heading give the name of the star, its Bonn-Durchmusterung number, magnitude and place for 1855, together with those of the comparison stars, and roughly the position angles of the latter from the main star. The sidereal time given is that of the middle of the observation. Under definition is designated the more unfavorable condition as regards steadiness and sharpness of the images, each having been recorded on a scale of 1 to 4, 1 being perfect seeing and 4 conditions so bad as to make good observations impossible. The temperature is that of the outer air. The results of the measures after being corrected for refraction and aberration are given in scale units, where $1^R = 12.''68$ approximately. The succeeding columns are either self-explanatory or have already been explained in § 2. Then follow the equations of condition, also explained in § 2, and the residuals from each after substitution of the values of the unknowns. Next are given the derived normal equations, the values of the unknowns together with their probable errors and weights resulting from the solution, the values of $[nn]$ and $[vv]$, the probable error of one equation, and finally the parallax in seconds of arc.

Lal. 47231	B. D. +45°, 4408	Mag. 8.3	R. A. $23^h\ 58.0^m$	Decl. +45° 1′	Pos. Angle.
a	+44°, 4538	6.0	23 53.4	44 27	236°.3
b	+45°, 16	7.7	0 2.6	45 35	53°.6

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July 24	19 58	2	68.5	287.714	275.663	+0.018	−0.020	563.375
	25	19 45	3	71	.648	.668	.018	.020	.314
1894	Dec. 20	4 11	1–2	29.5	287.651	275.620	+0.001	−0.001	563.271
	25	5 0	3	22	.632	.675	.001	.001	.307
	31	4 56	2	17	.693	.612	.000	.000	.305
1895	Dec. 3	3 50	3–4	19.5	287.733	275.666	−0.038	+0.041	563.402
	22	3 10	2	39	.717	.593	.040	.044	.314
	27	4 18	2–3	29	.702	.599	.041	.045	.305
1896	May 27	19 17	2	55	287.747	275.547	−0.057	+0.063	563.300
	June 2	19 45	2	49	.735	.567	.058	.064	.308
	11	20 25	2–3	51.5	.738	.550	.059	.065	.294
							Assumed Annual Proper Motion and Mean Sum:	+0.041	−0.045	563.320

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	12.051	−0.001	12.088	$+1.0x$	$+1.96y$	$-0.44z$	$= +0.049$	+0.031
C.	11.980	+ .000	.018	1.0	1.97	0.44	− .021	− .039
C.	12.031	+0.001	12.034	$+1.0x$	$-1.78y$	$-0.03z$	$= -0.005$	+0.015
C.	11.957	+ .000	11.959	1.0	1.84	0.02	− .080	− .059
C.	12.081	+ .000	12.081	1.0	1.90	0.00	+ .042	+ .063
C.	12.067	−0.002	11.986	$+1.0x$	$-1.47y$	$+0.92z$	$= -0.053$	−0.039
C.	.124	+ .000	12.040	1.0	1.81	0.97	+ .001	+ .018
C.	.103	+ .000	12.017	1.0	1.86	0.99	− .022	− .004
C.	12.200	+0.000	12.080	$+1.0x$	$+1.38y$	$+1.40z$	$= +0.041$	+0.023
C.	.168	+ .000	.046	1.0	1.53	1.42	+ .007	− .013
C.	.188	+ .001	.065	1.0	1.71	1.44	+ .026	+ .004

Assumed Mean Difference: 12.039

Normals:

$$\begin{aligned} +11.00x - 2.11y + 6.21z &= -0.015 \\ -2.11x + 33.95y - 0.03z &= +0.360 \\ +6.21x - 0.03y + 9.20z &= +0.023 \end{aligned}$$

Solution:

	R	R
$x =$	−0.0013	± 0.0104
$y =$	+0.0106	± 0.0047
$z =$	+0.0034	± 0.0113

Wt. 6.67
33.31
5.64

$[nn] = 0.01673$ $[vv] = 0.01283$ Prob. Error 1 Eq. = ± 0″.343

$$\pi = +0''.134 \pm 0''.059$$

Brad. 3212	B. D. +28°, 4704	Mag. 7.5	R. A. $23^h\ 59.1^m$	Decl. +28° 14′	Pos. Angle.
a	+27°, 4667	8.0	23 55.3	27 44	240°.4
b	+28°, 11	8.5	0 3.5	28 46	61°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1904	July	19	19	37	3–4	69	278.323	313.774	+0.007	−0.016	592.088
		28	19	27	3	61	.329	.768	.007	.016	.088
	Aug.	8	19	44	3	54	.335	.775	.006	.016	.100
1904	Nov.	28	4	2	2	16	278.327	313.791	+0.001	−0.003	592.116
	Dec.	4	4	50	3	21	.296	.770	.001	.003	.064
		28	4	33	3	24	.304	.753	.000	.000	.057
1905	Jan.	8	4	36	3	25	.300	.769	− .000	+ .001	.070
		20	4	29	2–3	29	.310	.748	.001	.002	.059
		23	4	44	3	13	.299	.770	.001	.002	.070
1905	June	25	20	1	3–4	59	278.365	313.736	−0.007	+0.017	592.111
	July	15	20	16	1–2	66	.330	.735	.008	.019	.076
		17	19	50	3	82	.338	.739	.008	.019	.088
Assumed Annual Proper Motion and Mean Sum:									+0.015	−0.036	592.082

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	35.451	−0.000	35.428	$+1.0\,x$	$-1.98\,y$	$-0.45\,z$	$= -0.008$	+0.010
S.	.439	− .000	.416	1.0	1.84	0.43	− .020	− .004
S.	.440	− .001	.417	1.0	1.72	0.40	− .019	− .004
S.	35.464	−0.002	35.458	$+1.0\,x$	$+1.59\,y$	$-0.09\,z$	$= +0.022$	−0.000
S.	.474	+ .001	.471	1.0	1.71	0.07	+ .035	+ .011
S.	.449	+ .001	.450	1.0	1.94	0.01	+ .014	− .012
S.	.469	+ .001	.471	1.0	1.94	+0.02	+ .035	+ .009
S.	.438	+ .001	.442	1.0	1.86	0.05	+ .006	− .019
S.	.471	+ .001	.475	1.0	1.82	0.06	+ .039	+ .014
S.	35.371	−0.002	35.393	$+1.0\,x$	$-1.99\,y$	$+0.48\,z$	$= -0.043$	−0.026
S.	.405	+ .000	.432	1.0	2.00	0.54	− .004	+ .013
S.	.401	− .000	.428	1.0	2.00	0.54	− .008	+ .009
Assumed Mean Difference:			35.436					

Normals:

$$+12.00\,x - 0.67\,y + 0.24\,z = +0.049$$
$$-0.67\,x + 41.97\,y - 0.78\,z = +0.467$$
$$+0.24\,x - 0.78\,y + 1.37\,z = -0.007$$

Solution:

	R	R	Wt.
$x =$	+0.0047	± 0.0029	11.9
$y =$	+0.0112	± 0.0016	41.5
$z =$	+0.0007	± 0.0084	1.4

$[nn] = 0.00742$ $[vv] = 0.00196$ Prob. Error 1 Eq. $= \pm 0''.126$

$\pi = +0''.142 \pm 0''.020$

Piazzi 0^h, 137	B. D. + 2°, 84	Mag. 7.5	R. A. 0^h 31.7^m	Decl. + 2° 19′	Pos. Angle.
a	+ 2°, 67	7.8	0 26.5	2 31	278°.4
b	+ °, 97	7.7	0 37.5	2 24	86°.8

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July 23	23	1	2–3	64.5	374.148	410.972	+0.142	−0.149	785.113
	Aug. 3	21	22	3	65	.149	.956	.140	.147	.098
	Sept. 26	22	5	2	49	.144	.921	.132	.138	.059
1892	Dec. 28	2	48	1–2	13.5	374.147	410.921	+0.116	−0.122	785.062
1893	Jan. 3	2	42	3	17.5	.156	.898	.115	.122	.047
	14	2	19	2–3	9	.174	.901	.114	.120	.069
1897	Jan. 12	1	53	3	15.5	374.386	410.684	−0.118	+0.124	785.076
	15	2	24	1–2	28	.360	.635	.118	.124	.001
	18	2	5	2–3	27.5	.391	.658	.119	.125	.055
1897	July 22	22	54	3	67	374.457	410.692	−0.148	+0.155	785.156
	Aug. 1	21	37	3	64	.440	.638	.150	.157	.085
	2	22	48	2	64	.438	.625	.150	.158	.071
							Assumed Annual Proper Motion and Mean Sum:	+0.058	−0.061	785.074

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	36.824	−0.002	36.531	$+1.0\,x$	$-1.67\,y$	$-2.44\,z$ =	+0.015	+0.016
C.	.807	− .001	.519	1.0	1.52	2.41	+ .003	+ .003
C.	.777	+ .001	.508	1.0	0.18	2.27	− .008	− .008
C.	36.774	+0.001	36.537	$+1.0\,x$	$+1.75\,y$	$-2.01\,z$ =	+0.021	+0.020
C.	.742	+ .002	.507	1.0	1.73	1.99	− .009	− .010
C.	.727	+ .000	.493	1.0	1.67	1.96	− .023	− .024
C.	36.298	−0.000	36.540	$+1.0\,x$	$+1.68\,y$	$+2.03\,z$ =	+0.024	+0.022
C.	.275	+ .003	.520	1.0	1.66	2.04	+ .004	+ .003
C.	.267	+ .001	.512	1.0	1.64	2.05	− .004	− .006
C.	36.235	−0.004	36.534	$+1.0\,x$	$-1.69\,y$	$+2.55\,z$ =	+0.018	+0.018
C.	.198	− .001	.504	1.0	1.55	2.58	− .012	− .012
C.	.187	+ .000	.495	1.0	1.53	2.58	− .021	− .021
	Assumed Mean Difference:		36.516					

Normals: $+12.00\,x + 2.00\,y + 0.75\,z = +0.008$ R
$+2.00\,x + 29.88\,y - 4.17\,z = +0.016$
$+0.75\,x - 4.17\,y + 61.06\,z = +0.005$

Solution: $x = +0.0006 \pm 0.0035$ R R
$y = +0.0005 \pm 0.0022$
$z = +0.0001 \pm 0.0015$

Wt. 11.85
29.25
60.39

$[nn] = 0.00286$ $[vv] = 0.00285$ Prob. Error 1 Eq. $= \pm 0''.152$

$\pi = +0''.006 \pm 0''.028$

54 Piscium	B. D. +20°, 85	Mag. 6.2	R. A. 0^h 31.8^m	Decl. +20° 28′	Pos. Angle.
a	+20°, 54	7·5	0 23·9	20 19	265°.2
b	+20°, 103	7·3	0 39·1	20 50	77°.8

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July	6	20	21	—	61.5	524.651	494.274	−0.073	+0.046	1018.898
		9	21	23	3	57·5	.668	.280	.073	.046	.921
		14	20	35	2–3	59·5	.663	.271	.072	.045	.907
1895	Jan.	4	4	37	2	12.5	524.543	494.356	+0.000	−0.000	1018.899
		20	4	9	2	19.5	.546	.321	.002	.001	.868
		31	4	35	1–2	18	.552	.355	.004	.002	.909
1896	Jan.	5	4	34	2	3.5	524.467	494.366	+0.049	−0.031	1018.851
		28	3	33	—	26	.479	.350	.052	.033	.848
	Feb.	14	4	16	2	29	.491	.380	.055	.035	.891
1896	June	10	21	2	2–3	48.5	524.512	494.383	+0.071	−0.045	1018.921
		11	21	16	—	51	.554	.379	.071	.045	.959
		18	21	25	2	61.5	.537	.367	.072	.045	.931
							Assumed Annual Proper Motion and Mean Sum:		−0.049	+0.031	1018.900

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	30.377	+0.000	30.258	+1.0 x	+1.93 y	−1.49 z	= +0.022	−0.011
C.	.388	− .001	.268	1.0	1.93	1.48	+ .032	− .001
C.	.392	− .000	.275	1.0	1.91	1.47	+ .039	+ .007
C.	30.187	+0.000	30.187	+1.0 x	−1.89 y	+0.01 z	= −0.049	−0.011
C.	.225	+ .001	.229	1.0	1.77	0.05	− .007	+ .028
C.	.197	− .000	.203	1.0	1.63	0.08	− .033	− .000
C.	30.101	+0.001	30.182	+1.0 x	−1.88 y	+1.01 z	= −0.054	−0.018
C.	.129	+ .002	.216	1.0	1.68	1.07	− .020	+ .012
C.	.111	+ .000	.201	1.0	1.35	1.12	− .035	− .009
C.	30.129	−0.00	30.244	+1.0 x	+1.80 y	+1.44 z	= +0.008	−0.026
C.	.175	− .002	.289	1.0	1.82	1.44	+ .053	+ .018
C.	.170	− .001	.286	1.0	1.90	1.46	+ .050	+ .014
	Assumed Mean Difference:		30.236					

Normals:

			R	
+ 12.00 x	+ 1.09 y	+ 3.24 z	= +0.006	
+ 1.09	+38.78	− 6.01	= +0.724	
+ 3.24	− 6.01	+16.27	= −0.095	

Solution:

	R	R	
x =	−0.0016	± 0.0036	Wt. 11.22
y =	+0.0190	± 0.0020	36.10
z =	+0.0015	± 0.0032	14.37

$[nn] = 0.01648$ $[vv] = 0.00285$ Prob. Error 1 Eq. = ± 0.″152

$\pi = +0.″241 \pm 0.″026$

54 Piscium	B. D. +20°, 85	Mag. 6.2	R. A. 0^h 31.8^m	Decl. +20° 28′	Pos. Angle.
a	+20°, 54	7·5	0 23.9	20 19	265°.2
b	+20°, 103	7·3	0 39.1	20 50	77°.8

Date.	Sid. Time. h. m.	Def.	Temp. c	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1899 June 29	21 42	2–3	56	524.384	494.534	−0.025	+0.016	1018.909
30	21 17	2–3	52	·397	·524	.025	.016	.912
July 2	21 23	1–2	61	·383	·539	.025	.016	.913
1899 Dec. 26	3 36	2	17	524.353	494.576	−0.001	+0.001	1018.929
1900 Jan. 6	4 34	2–3	27·5	·329	·535	+ .000	− .000	.864
8	4 15	3	21	·351	·569	.001	.001	.920
10	4 18	3	32	·340	·552	.001	.001	.892
16	4 19	2–3	34	·349	·546	.002	.001	.896
22	4 47	2	36.5	·322	·554	.003	.002	.877
1900 July 7	21 25	3	71	524.371	494.593	+0.025	−0.016	1018.973
10	21 59	3	63	·367	.608	.025	.016	.984
13	21 20	3	65.5	·362	·590	.026	.016	.962
Assumed Annual Proper Motion and Mean Sum:						−0.049	+0.031	1018.919

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	29.850	+0.000	29.809	$+1.0\,x$	$+1.93\,y$	$-0.51\,z$	$= +0.009$	−0.006
C.	.873	+ .000	.832	1.0	1.93	0.51	+ .032	+ .017
C.	.844	+ .000	.803	1.0	1.93	0.50	+ .003	− .012
C.	29.777	−0.000	29.775	$+1.0\,x$	$-1.86\,y$	$-0.02\,z$	$= -0.025$	−0.013
C.	.794	+ .002	.796	1.0	1.86	+0.01	− .004	+ .008
C.	.782	− .000	.784	1.0	1.85	0.02	− .016	− .004
C.	.788	+ .001	.791	1.0	1.84	0.02	− .009	+ .003
C.	.803	+ .001	.807	1.0	1.80	0.04	+ .007	+ .019
C.	.768	+ .001	.774	1.0	1.75	0.06	− .026	− .014
C.	29.778	−0.002	29.817	$+1.0\,x$	$+1.93\,y$	$+0.51\,z$	$= +0.017$	+0.007
C.	.759	− .002	.798	1.0	1.92	0.52	− .002	− .011
C.	.772	− .001	.813	1.0	1.91	0.53	+ .013	− .004
Assumed Mean Difference:			29.800					

Normals:

			R	
$+12.00\,x$	$+0.59\,y$	$+0.17\,z$	$= -0.001$	Wt. 11.97
$+0.59$	$+42.26$	-0.16	$= +0.272$	42.26
$+0.17$	-0.16	$+1.58$	$= -0.009$	1.58

Solution:

	R	R
x	$= -0.0003$	± 0.0025
y	$= +0.0064$	± 0.0013
z	$= -0.0051$	± 0.0069

$[nn] = 0.00328$ $[vv] = 0.00148$ Prob. Error 1 Eq. $= \pm 0''.110$

$\pi = +0''.081 \pm 0''.017$

54 Piscium	BD +20°, 85	Mag. 6.2	R. A. $0^h\ 31.8^m$	Decl. +20° 28′	Pos. Angle.
c	+20°, 71	8.7	0 28.3	20 9	249°.7
d	+20°, 88	8.7	0 35.3	21 0	56°.7

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1899 June 18	21 7	2–3	55.5	250.872	277.252	−0.020	+0.013	528.117
21	20 23	2–3	57	.891	.206	.020	.013	.090
26	21 28	2	58	.847	.229	.019	.012	.069
29	21 4	2–3	56.5	.863	.262	.019	.012	.118
1899 Dec. 26	4 16	2	16	250.832	277.247	−0.001	+0.000	528.078
1900 Jan. 2	4 44	3	16.5	.815	.227	+ .000	− .000	.042
4	4 24	3–4	21	.779	.276	.000	.000	.053
6	3 54	2–3	28.5	.825	.268	.000	.000	.093
16	3 47	2–3	34.5	.818	.264	.001	.001	.082
21	4 32	3–4	22.5	.805	.289	.002	.001	.095
22	3 43	1–2	36	.775	.260	.002	.001	.036
27	3 47	2–3	18	.796	.274	.003	.002	.071
1900 July 5	20 35	3	69.5	250.815	277.249	+0.019	−0.012	528.071
7	20 38	3	71	.824	.264	.019	.012	.095
10	20 46	3	63	.804	.265	.019	.012	.076
13	20 44	3	65.5	.873	.270	.020	.013	.150
Assumed Annual Proper Motion and Mean Sum:						−0.037	+0.024	528.083

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	26.380	−0.002	26.411	$+1.0\,x$	$-1.91\,y$	$-0.54\,z$	$= -0.017$	+0.011
C.	.315	− .000	.348	1.0	1.93	0.53	− .080	− .051
C.	.382	+ .001	.414	1.0	1.95	0.52	− .014	+ .015
C.	.399	− .002	.428	1.0	1.96	0.51	− .000	+ .029
C.	26.415	+0.000	26.416	$+1.0\,x$	$+1.89\,y$	$-0.02\,z$	$= -0.012$	−0.040
C.	.412	+ .002	.414	1.0	1.93	+0.00	− .014	− .043
C.	.497	+ .001	.498	1.0	1.93	0.01	+ .070	+ .041
C.	.443	− .000	.443	1.0	1.94	0.01	+ .015	− .014
C.	.446	+ .000	.444	1.0	1.91	0.04	+ .016	− .013
C.	.484	− .001	.480	1.0	1.87	0.06	+ .052	+ .024
C.	.485	+ .002	.484	1.0	1.86	0.06	+ .056	+ .028
C.	.478	+ .001	.474	1.0	1.80	0.07	+ .046	+ .019
C.	26.434	+0.001	26.404	$+1.0\,x$	$-1.99\,y$	$+0.51\,z$	$= -0.024$	+0.002
C.	.440	− .001	.408	1.0	2.00	0.51	− .020	+ .006
C.	.461	+ .000	.430	1.0	2.00	0.52	+ .002	+ .028
C.	.397	− .003	.361	1.0	1.99	0.53	− .067	− .041
Assumed Mean Difference:	26.428							

Normals:

$$+16.00\,x - 0.60\,y + 0.20\,z = +0.009$$
$$-0.60 + 59.61 + 0.36 = +0.859$$
$$+0.20 + 0.36 + 2.17 = +0.013$$

Solution: R R

$x = +0.0009 \pm 0.0054$ Wt. 15.97
$y = +0.0144 \pm 0.0028$ 59.53
$z = +0.0037 \pm 0.0147$ 2.17

$[nn] = 0.02598$ $[vv] = 0.01351$ Prob. Error 1 Eq. $= \pm 0''.275$

$$\pi = +0''.183 \pm 0''.035$$

54 Piscium	B. D. +20°, 85	Mag. 6.2	R. A. 0h 31.8m	Decl. +20° 28′	Pos. Angle.
e	+20°, 82	7·5	0 30.1	20 18	248°.3
f	+20°, 87	5·5	0 32.3	20 40	33°.5

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *e*. R	Distance *f*. R	P. M. Corrections. R	R	Corrected Sum. R
1899 June 16	21	9	2–3	52	124.355	60.615	—0.017	+0.027	184.980
21	21	11	2–3	56.5	.348	.607	.016	.026	.965
26	21	57	2	58	.303	.635	.016	.025	.947
30	21	55	2–3	51.5	.333	.607	.016	.025	.949
1900 Jan. 2	4	8	3	17	124.295	60.644	+0.000	—0.000	184.939
4	5	2	3–4	21	.289	.647	.000	.000	.936
6	3	21	2–3	29.5	.281	.659	.000	.000	.940
8	3	44	3	21	.288	.636	.001	.001	.924
10	3	46	3	33	.286	.626	.001	.001	.912
21	5	4	3–4	22	.285	.621	.002	.002	.906
22	4	15	2	36	.295	.646	.002	.003	.940
27	4	23	2–3	17.5	.281	.638	.002	.003	.918
1900 July 5	21	49	3	68.5	124.305	60.669	+0.016	—0.025	184.965
7	22	9	3	71.5	.292	.664	.016	.025	.947
10	21	24	3	63	.306	.666	.016	.025	.963
13	21	54	3	65.5	.307	.668	.016	.026	.965
Assumed Annual Proper Motion and Mean Sum:							—0.031	+0.049	184.943

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	63.740	—0.013	63.683	+1.0 x	+1.72 y	−0.55 z =	+0.020	+0.013
C.	.741	— .008	.691	1.0	1.77	0.53	+ .028	+ .021
C.	.668	— .001	.626	1.0	1.81	0.52	— .037	— .044
C.	.726	— .002	.683	1.0	1.83	0.51	+ .020	+ .013
C.	63.651	+0.001	63.652	+1.0 x	−1.77 y	+0.00 z =	−0.011	−0.004
C.	.642	+ .002	.644	1.0	1.78	0.01	— .019	— .011
C.	.622	+ .001	.623	1.0	1.78	0.01	— .040	— .032
C.	.652	+ .007	.661	1.0	1.79	0.02	— .002	+ .005
C.	.660	+ .011	.673	1.0	1.79	0.02	+ .010	+ .017
C.	.664	+ .013	.681	1.0	1.77	0.05	+ .018	+ .025
C.	.649	+ .001	.655	1.0	1.76	0.06	— .008	— .001
C.	.643	+ .009	.657	1.0	1.70	0.07	— .006	+ .001
C.	63.636	—0.008	63.669	+1.0 x	+1.85 y	+0.51 z =	+0.006	−0.003
C.	.628	— .001	.668	1.0	1.86	0.51	+ .005	— .004
C.	.640	— .007	.674	1.0	1.86	0.52	+ .011	+ .002
C.	.639	— .007	.674	1.0	1.86	0.53	+ .011	+ .002
Assumed Mean Difference:			63.663					

R

Normals: $+16.00\,x + 0.42\,y + 0.20\,z = +0.006$

$+0.42 + 51.47 - 0.36 = +0.216$

$+0.20 - 0.36 + 2.18 = +0.002$

R R

Solution: $x = +0.0001 \pm 0.0033$ Wt. 15.98

$y = +0.0042 \pm 0.0018$ 51.40

$z = +0.0016 \pm 0.0089$ 2.18

$[nn] = 0.00587$ $[vv] = 0.00495$ Prob. Error 1 Eq. $= \pm 0''.167$

$\pi = +0''.054 \pm 0''.023$

	Lal. 1045	B. D. +39°, 154	Mag. 7.0	R. A. $0^h\ 32.9^m$	Decl. +39° 25′	Pos. Angle.
a		+39°, 115	7.2	0 25.7	39 18	265°.7
b		+39°, 189	8.2	0 41.6	39 30	86°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July	6	19	35	–	63	395.123	473.436	+0.034	−0.037	868.556
		9	20	45	3	59.5	.121	.430	.034	.037	.548
		10	19	55	2	60.5	.147	.443	.034	.037	.587
1895	Jan.	4	5	12	2	12	395.143	473.372	−0.000	+0.000	868.515
		29	5	53	2	14.5	.146	.404	.002	.002	.550
1896	Jan.	5	5	16	2	2.5	395.173	473.366	−0.023	+0.025	868.541
	Feb.	7	4	4	–	35.5	.162	.315	.025	.027	.479
		13	5	0	2	23.5	.178	.365	.026	.028	.545
1896	June	10	20	34	2–3	49.5	395.192	473.365	−0.033	+0.036	868.560
		15	20	56	–	51	.200	.359	.033	.036	.562
		18	20	48	2	62	.200	.391	.034	.036	.593
1897	Jan.	19	3	49	3	7	395.172	473.329	−0.047	+0.051	868.505
								Assumed Annual Proper Motion and Mean Sum:	+0.023	−0.025	868.548

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	78.313	−0.001	78.241	$+1.0\,x$	$-1.89\,y$	$-1.49\,z$	$= +0.003$	+0.007
C.	.309	− .000	.238	1.0	1.89	1.48	+ .000	+ .004
C.	.296	− .004	.221	1.0	1.88	1.48	− .017	− .012
C.	78.229	+0.003	78.232	$+1.0\,x$	$+1.82\,y$	$+0.01\,z$	$= -0.006$	−0.007
C.	.258	− .000	.262	1.0	1.62	0.08	+ .024	+ .023
C.	78.193	+0.000	78.241	$+1.0\,x$	$+1.82\,y$	$+1.01\,z$	$= +0.003$	−0.001
C.	.153	+ .006	.211	1.0	1.48	1.10	− .027	− .031
C.	.187	+ .000	.241	1.0	1.37	1.12	+ .003	− .001
C.	78.173	−0.001	78.241	$+1.0\,x$	$-1.76\,y$	$+1.44\,z$	$= +0.003$	+0.000
C.	.159	− .001	.227	1.0	1.82	1.45	− .011	− .014
C.	.191	− .004	.257	1.0	1.85	1.46	+ .019	+ .016
C.	78.157	+0.004	78.259	$+1.0\,x$	$+1.75\,y$	$+2.05\,z$	$= +0.021$	+0.015
	Assumed Mean Difference:	78.238						

Normals:

			R	
$+12.00\,x$	$-1.23\,y$	$+5.27\,z$	$= +0.015$	Wt. 10.26
-1.23	$+36.87$	$+9.27$	$= +0.040$	31.46
$+5.27$	$+9.27$	$+20.59$	$= +0.058$	15.65

Solution:

	R	R
$x =$	+0.0002	± 0.0034
$y =$	+0.0005	± 0.0020
$z =$	+0.0026	± 0.0027

$[nn] = 0.00259$ $[vv] = 0.00243$ Prob. Error 1 Eq. $= \pm 0''.140$

$\pi = +0''.006 \pm 0''.025$

Lal. 1198	B. D. +1°, 131	Mag. 8.2	R. A. 0^h 37.6^m	Decl. +1° 0′	Pos. Angle.
a	+1°, 124	7.8	0 35.9	1 16	299°.2

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	P. M. Correction. R	Corrected Sum from Piazzi 0^h, 137 R
1892	July 25	23 10	2	71	146.142	+0.036	785.090*
	Aug. 3	21 50	3	65	.140	.036	.098
	Sept. 26	22 31	2	49	.135	.034	.059
1892	Dec. 28	3 17	1–2	13	146.139	+0.030	785.062
1893	Jan. 3	3 2	3	16.5	.174	.030	.047
	25	3 1	2	31	.147	.029	.059*
1897	Jan. 12	2 20	3	14	146.187	−0.030	785.076
	18	2 6	2–3	27.5	.199	.031	.055
1897	July 22	23 23	—	66.5	146.278	−0.038	785.156
	Aug. 1	22 16	3	64	.219	.039	.085
	2	23 17	2	63.5	.207	.039	.071
					Assumed Annual Proper Motion and Mean Sum:	+0.015	785.077

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	−0.002	146.176	$+1.0x$	$+0.57y$	$-2.44z$ =	−0.003	−0.007
C.	− .004	.172	1.0	0.53	2.41	− .007	− .011
C.	+ .003	.172	1.0	0.10	2.27	− .007	− .008
C.	+0.003	146.172	$+1.0x$	$-0.60y$	$-2.01z$ =	−0.007	−0.005
C.	+ .006	.210	1.0	0.59	1.99	+ .031	+ .033
C.	+ .003	.179	1.0	0.53	1.93	+ .000	+ .002
C.	+0.000	146.157	$+1.0x$	$-0.58y$	$+2.03z$ =	−0.022	−0.021
C.	+ .004	.172	1.0	0.57	2.05	− .007	− .006
C.	−0.015	146.225	$+1.0x$	$+0.59y$	$+2.55z$ =	+0.046	+0.041
C.	− .001	.179	1.0	0.55	2.58	+ .000	− .005
C.	+ .901	.169	1.0	0.54	2.58	− .010	− .015
		Assumed Mean Distance: 146.179					

Normals:

$$+11.00x + 0.01y - 1.26z = +0.014$$
$$+0.01 + 3.20 + 2.47 = +0.018$$
$$-1.26 + 2.47 + 56.77 = +0.024$$

Solution:

	R	R	
$x =$	+0.0013	± 0.0044	Wt. 10.97
$y =$	+0.0054	± 0.0082	3.09
$z =$	+0.0002	± 0.0020	54.72

$[nn] = 0.00387$ $[vv] = 0.00374$ Prob. Error 1 Eq. = ± 0″.186

$\pi = +0''.069 \pm 0''.105$

* Mean value of sum for epoch, since Piazzi 0^h, 137 was not observed on these nights.

Mayer 20	B. D. +4°, 123	Mag. 6.0	R. A. $0^h\ 40.8^m$	Decl. +4° 32′	Pos. Angle.
a	+4°, 109	8.2	0 37.6	4 22	260°.6
b	+5°, 130	8.1	0 46.5	5 1	70°.6

Date.			Sid. Time. h m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July	25	23 44	2	70.5	230.604	424.651	+0.098	−0.068	655.285
	Aug.	3	22 22	3	64.5	.619	.653	.096	.067	.301
	Sept.	28	22 1	3	60	.610	.672	.090	063	.309
1892	Dec.	28	3 35	1–2	13	230.602	424.655	+0.081	−0.056	655.282
1893	Jan.	3	3 26	3	15.5	.617	.674	.080	.056	.315
		25	2 41	2	31.5	.602	.652	.078	.054	.278
1897	Jan.	8	2 39	3	23.5	230.742	424.557	−0.081	+0.056	655.274
		12	2 53	3	13	.755	.519	.081	.057	.250
		18	2 43	2–3	26.5	.756	.531	.081	.057	.263
1897	July	25	22 58	1–2	66	230.807	424.542	−0.102	+0.072	655.319
	Aug.	1	22 49	3	63.5	.835	.526	.103	.072	.330
		2	21 47	2	64	.823	.541	.103	.072	.333
						Assumed Annual Proper Motion and Mean Sum:		+0.040	−0.028	655.295

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	194.047	+0.003	193.884	$+1.0\,x$	$-1.86\,y$	$-2.44\,z$	$= -0.020$	+0.009
C.	.034	− .001	.870	1.0	1.71	2.41	− .034	− .007
C.	.062	− .004	.905	1.0	0.22	2.26	+ .001	+ .008
C.	194.053	+0.004	193.920	$+1.0\,x$	$+1.93\,y$	$-2.01\,z$	$= +0.016$	−0.004
C.	.057	− .006	.915	1.0	1.91	1.99	+ .011	− .009
C.	.050	+ .005	.923	1.0	1.75	1.94	+ .019	+ .001
C.	193.815	+0.006	193.958	$+1.0\,x$	$+1.90\,y$	$+2.02\,z$	$= +0.054$	+0.029
C.	.764	+ .013	.915	1.0	1.88	2.03	+ .011	− .014
C.	.775	+ .009	.922	1.0	1.83	2.04	+ .018	− .006
C.	193.735	−0.007	193.902	$+1.0\,x$	$-1.86\,y$	$+2.56\,z$	$= -0.002$	+0.021
C.	.691	− .010	.856	1.0	1.76	2.58	− .048	− .027
C.	.718	− .011	.882	1.0	1.73	2.58	− .022	− .001

Assumed Mean Difference: 193.904

Normals: $+12.00\,x + 2.06\,y + 0.76\,z = +0.004$ (R)
$+2.06 + 36.90 - 4.27 = +0.463$
$+0.76 - 4.27 + 60.86 = +0.020$

Solution: $x = -0.0019 \pm 0.0032$ (R) Wt. 11.9
$y = +0.0128 \pm 0.0018$ (R) 36.2
$z = +0.0013 \pm 0.0014$ (R) 60.3

$[nn] = 0.00845$ $[vv] = 0.00251$ Prob. Error 1 Eq. $= \pm 0''.142$

$\pi = +0''.162 \pm 0''.023$

Groom. 145	B. D. +69°, 45	Mag. 7.8	R. A. $0^h\ 40.4^m$	Decl. +69° 39′	Pos. Angle.
a	+68°, 29	7.2	0 22.6	68 59	247°.1
b	+70°, 78	6.7	0 57.0	70 9	70°.5

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July 28	19	59	3	74.5	484.386	427.717	+0.009	−0.012	912.100
	Aug. 24	21	38	2	66	.385	.727	.007	.010	.109
	Sept. 20	21	22	2	62.5	.380	.685	.006	.008	.063
1895	Jan. 17	5	33	1–2	20	484.361	427.680	−0.001	+0.001	912.041
	20	5	31	1–2	19	.349	.728	.001	.001	.077
	Feb. 14	4	57	2–3	25	.352	.656	.002	.003	.009
1897	Jan. 23	5	5	1–2	21	484.386	427.607	−0.041	+0.060	912.012
	26	5	0	3–4	17	.405	.620	.041	.060	.044
	30	6	36	3–4	17.5	.408	.633	.042	.060	.059
1897	Aug. 3	21	10	1–2	66.5	484.446	427.626	−0.052	+0.075	912.095
	5	20	22	3	57.5	.440	.660	.052	.075	.123
	6	21	13	1–2	64.5	.418	.622	.052	.075	.063
								Assumed Annual Proper Motion and Mean Sum:	+0.020	−0.029	912.066

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	56.669	−0.002	56.688	$+1.0\,x$	$+1.95\,y$	$-0.43\,z$	$= +0.012$	+0.006
C.	.658	− .003	.672	1.0	1.68	0.36	− .004	− .010
C.	.695	+ .000	.709	1.0	1.03	0.28	+ .033	+ .028
C.	56.681	+0.002	56.681	$+1.0\,x$	$-1.88\,y$	$+0.04\,z$	$= +0.005$	+0.006
C.	.621	− .001	.618	1.0	1.88	0.05	− .058	− .057
C.	.696	+ .004	.695	1.0	1.72	0.12	+ .019	+ .020
C.	56.779	+0.003	56.681	$+1.0\,x$	$-1.88\,y$	$+2.06\,z$	$= +0.005$	+0.010
C.	.785	+ .001	.685	1.0	1.87	2.07	+ .009	+ .014
C.	.775	+ .000	.673	1.0	1.87	2.08	− .003	+ .002
C.	56.820	−0.002	56.691	$+1.0\,x$	$+1.92\,y$	$+2.59\,z$	$= +0.015$	+0.015
C.	.780	− .004	.649	1.0	1.90	2.59	− .027	− .027
C.	.796	+ .000	.669	1.0	1.90	2.60	− .007	− .007
			Assumed Mean Difference:	56.676				

Normals:

			R
$+12.00\,x$	$-0.72\,y$	$+13.13\,z$	$= -0.001$
-0.72	$+39.14$	$+1.09$	$= +0.062$
$+13.13$	$+1.09$	$+33.43$	$= -0.039$

Solution:

	R	R	
x	$= +0.0023$	± 0.0065	Wt. 6.81
y	$= +0.0017$	± 0.0028	38.91
z	$= -0.0022$	± 0.0039	18.93

$[nn] = 0.00612$ $\quad [vv] = 0.00592$ $\quad$ Prob. Error 1 Eq. $= \pm\ ''0.216$

$$\pi = +\ ''0.022 \pm ''0.034$$

Lal. 1799	B. D. +4°, 158	Mag. 8.3	R. A. $0^h\ 54.9^m$	Decl. +4° 16′	Pos. Angle.
b	+4°, 166	7.4	0 56.2	4 27	60°.8

	Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *b*. R	P. M. Correction. R	Corrected Sum from Mayer 20. R
1892	July 26	23 51	2	73.5	105.964	−0.083	655.298 *
	Aug. 3	22 52	3	64.5	.944	.082	.301
	Sept. 28	22 41	3	58.5	.956	.077	.309
1892	Dec. 28	3 55	1–2	12.5	105.940	−0.068	655.282
1893	Jan. 3	3 48	3	15	.965	.068	.315
	25	3 19	2	30.5	.948	.066	.278
1897	Jan. 8	3 1	3	23	105.817	+0.069	655.274
	12	3 17	3	12	.799	.069	.250
	18	3 9	2–3	25.5	.806	.070	.263
1897	July 25	23 35	1–2	66.5	105.803	+0.087	655.319
	Aug. 1	23 15	3	63	.796	.088	.330
	2	22 16	2	64	.792	.088	.333
	Assumed Annual Proper Motion and Mean Sum:					−0.034	655.296

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	−0.000	105.881	$+1.0x$	$-0.95y$	$-2.44z$	$=+0.001$	+0.007
C.	− .001	.861	1.0	0.90	2.41	= − .019	− .013
C.	− .002	.877	1.0	0.14	2.26	= − .003	− .000
C.	+0.002	105.874	$+1.0x$	$+0.95y$	$-2.01z$	$=-0.006$	−0.008
C.	− .003	.894	1.0	0.95	1.99	= + .014	+ .012
C.	+ .003	.885	1.0	0.92	1.93	= + .005	+ .003
C.	+0.004	105.890	$+1.0x$	$+0.96y$	$+2.02z$	$=+0.010$	+0.005
C.	+ .007	.875	1.0	0.96	2.03	= − .005	− .009
C.	+ .005	.881	1.0	0.94	2.05	= + .001	− .003
C.	−0.004	105.886	$+1.0x$	$-0.96y$	$+2.56z$	$=+0.006$	+0.008
C.	− .005	.879	1.0	0.92	2.58	= − .001	+ .001
C.	− .006	.874	1.0	0.91	2.58	= − .006	− .004
Assumed Mean Distance:		105.880					

Normals:

$$+12.00x + 0.90y + 0.78z = -0.003$$
$$+0.90x + 9.70y - 2.13z = +0.035$$
$$+0.78x - 2.13y + 60.86z = +0.034$$

Solution:

$$x = -0.0005 \pm 0.0017 \quad \text{Wt. } 11.90$$
$$y = +0.0037 \pm 0.0019 \quad 9.56$$
$$z = +0.0007 \pm 0.0007 \quad 60.31$$

$[nn] = 0.00083$ $[vv] = 0.00067$ Prob. Error 1 Eq. $= \pm 0''.074$

$$\pi = +0''.046 \pm 0''.024$$

* Mean for epoch.

Lal. 1964	B. D. +22°, 176	Mag. 8.4	R. A. 0^h 59.8^m	Decl. +22° 12′	Pos. Angle.
a	+21°, 135	8.8	0 55.5	22 0	259°.5
b	+22°, 192	7.5	1 4.6	22 29	75°.4

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July	24	20 41	2–3	67	288.613	327.135	0.000	0.000	615.748
	Sept.	20	22 16	2	62	.624	.166	.000	.000	.790
1895	Jan.	17	5 0	1–2	21.5	288.576	327.143	0.000	0.000	615.719
		26	5 11	3	31.5	.569	.135	.000	.000	.704
	Feb.	14	4 19	2–3	25.5	.590	.131	.000	.000	.721
1897	Jan.	23	4 18	1–2	22	288.620	327.158	0.000	0.000	615.778
		26	4 21	3–4	17.5	.573	.151	.000	.000	.724
		30	4 35	3–4	19	.587	.151	.000	.000	.738
1897	Aug.	3	22 31	1–2	66	288.598	327.133	0.000	0.000	615.731
		6	23 4	1–2	62.5	.601	.128	.000	.000	.729
		13	21 48	2–3	61.5	.605	.160	.000	.000	.765
								0.000	0.000	615.743

Assumed Annual Proper Motion and Mean Sum: 0.000 0.000 615.743

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	38.522	−0.000	38.522	$+1.0\,x$	$-1.94\,y$	$-0.44\,z$	$=-0.025$	−0.007
C.	.542	− .003	.539	1.0	0.76	0.28	− .008	+ .001
C.	38.567	+0.002	38.569	$+1.0\,x$	$+1.89\,y$	$+0.04\,z$	$=+0.022$	+0.011
C.	.566	+ .002	.568	1.0	1.83	0.07	+ .021	+ .010
C.	.541	+ .001	.542	1.0	1.57	0.12	− .005	− .014
C.	38.538	−0.002	38.536	$+1.0\,x$	$+1.85\,y$	$+2.06\,z$	$=-0.011$	−0.027
C.	.578	+ .001	.579	1.0	1.83	2.07	+ .032	+ .016
C.	.564	+ .000	.564	1.0	1.80	2.08	+ .017	+ .002
C.	38.535	+0.001	38.536	$+1.0\,x$	$-1.84\,y$	$+2.59\,z$	$=-0.011$	−0.001
C.	.527	+ .001	.528	1.0	1.81	2.59	− .019	− .009
C.	.555	− .001	.554	1.0	1.72	2.61	+ .007	+ .016

Assumed Mean Difference: 38.547

Normals:

$$+11.00\,x + 2.70\,y + 13.51\,z = +0.020$$
$$+2.70\,x + 33.36\,y - 1.14\,z = +0.236$$
$$+13.51\,x - 1.14\,y + 33.36\,z = +0.032$$

Solution:

$$x = -0.0029 \pm 0.0045 \quad \text{Wt. } 5.25$$
$$y = +0.0074 \pm 0.0018 \quad 31.52$$
$$z = +0.0024 \pm 0.0026 \quad 16.16$$

$[nn] = 0.00365$ $[vv] = 0.00189$ Prob. Error 1 Eq. $= \pm 0''.131$

$$\pi = +0''.094 \pm 0''.023$$

Lal. 1966	B. D. +60°, 170	Mag. 7.8	R. A. 1^h 0.4^m	Decl. +60° 46′	Pos. Angle.
a	+60°, 157	6.5	0 54.7	60 18	236°.2
b	+61°, 233	7.5	1 6.8	61 8	64°.3

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July	28	20	34	3	74	242.602	242.471	+0.019	−0.024	485.068
	Aug.	23	21	46	1–2	67	.587	.446	.016	.020	.029
		24	20	56	2	66.5	.569	.438	.016	.020	.003
1895	Jan.	17	6	24	1–2	19.5	242.559	242.412	−0.002	+0.002	484.971
		26	5	56	3	30	.601	.431	.003	.004	485.033
	Feb.	14	5	41	2–3	24	.575	.387	.005	.007	484.964
1897	Jan.	23	5	45	1–2	21	242.673	242.313	−0.093	+0.117	485.010
		26	5	42	3–4	17	.665	.315	.093	.118	.005
		30	5	58	3–4	18	.670	.295	.094	.119	484.990
1897	Aug.	3	21	44	1–2	66.5	242.705	242.280	−0.116	+0.148	485.017
		5	21	3	3	58	.727	.264	.116	.148	.023
		6	22	26	1–2	63.5	.722	.275	.116	.148	.029
							Assumed Annual Proper Motion and Mean Sum:		+0.045	−0.057	485.012

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	0.131	−0.000	0.174	$+1.0\,x$	$+2.01\,y$	$-0.43\,z$	= +0.008	−0.003
C.	.141	− .000	.177	1.0	1.89	0.37	+ .011	+ .001
C.	.131	+ .000	.167	1.0	1.88	0.37	+ .001	− .009
C.	0.147	+0.000	0.143	$+1.0\,x$	$-1.88\,y$	$+0.04\,z$	= −0.023	−0.012
C.	.170	− .000	.163	1.0	1.94	0.07	− .003	+ .008
C.	.188	+ .000	.176	1.0	1.89	0.12	+ .010	− .021
C.	0.360	+0.000	0.150	$+1.0\,x$	$-1.92\,y$	$+2.06\,z$	= −0.016	−0.006
C.	.350	+ .000	.139	1.0	1.94	2.07	− .027	− .017
C.	.375	+ .000	.162	1.0	1.96	2.08	− .004	+ .007
C.	0.425	−0.000	0.161	$+1.0\,x$	$+2.02\,y$	$+2.59\,z$	= −0.005	−0.017
C.	.463	− .000	.199	1.0	2.03	2.59	+ .033	+ .021
C.	.447	− .000	.183	1.0	2.03	2.59	+ .017	+ .005
	Assumed Mean Difference:		0.166					

Normals:

			R	
$+12.00\,x$	$+0.33\,y$	$+13.04\,z$	= +0.002	
+0.33	+45.61	+0.98	= +0.252	
+13.04	+0.98	+33.45	= +0.012	

Solution:

	R	R	
x =	−0.0003	± 0.0037	Wt. 6.89
y =	+0.0055	± 0.0014	45.58
z =	+0.0003	± 0.0021	19.27

$[nn] = 0.00323$ $\quad [vv] = 0.00184$ $\quad$ Prob. Error 1 Eq. = ± 0″.122

$\pi = +0''.070 \pm 0''.017$

Lal. 2450	B. D. +17°, 197	Mag. 7.9	R. A. $1^h\ 14.6^m$	Decl. +17° 56′	Pos. Angle.
a	+18°, 171	8.8	1 10.2	18 3	277°.3
b	+17°, 206	8.8	1 18.7	17 28	115°.1

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903 Jan. 30	5 30	3–4	27	287.021	319.010	+0.033	−0.037	606.027
Feb. 12	5 26	3	40.5	.065	.011	.032	.036	.072
14	5 40	–	24.5	.042	318.976	.032	.035	.015
1903 July 15	21 29	2–3	53.5	287.081	318.983	+0.017	−0.019	606.062
23	21 30	2–3	66.5	.037	.978	.016	.018	.013
24	21 42	3–4	62.5	.076	.969	.016	.018	.043
27	21 51	2	53	.033	.981	.015	.017	.012
Aug. 1	21 41	3	57	.054	.967	.015	.017	.019
2	21 39	3	61	.070	.998	.015	.017	.066
1904 Jan. 17	4 59	3–4	11	287.072	318.969	−0.001	+0.002	606.042
24	5 14	2	23.5	.087	.948	.002	.002	.035
25	5 5	2	11.5	.073	.967	.002	.003	.041
Assumed Annual Proper Motion and Mean Sum:						+0.036	−0.040	606.037

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	31.989	+0.000	31.919	$+1.0\,x$	$+1.39\,y$	$-0.92\,z$	$= +0.031$	+0.031
C.	.946	− .002	.876	1.0	1.23	0.89	− .012	− .012
C.	.934	+ .001	.868	1.0	1.20	0.88	− .020	− .020
C.	31.902	−0.001	31.865	$+1.0\,x$	$-1.57\,y$	$-0.47\,z$	$= -0.023$	−0.022
C.	.941	+ .001	.908	1.0	1.53	0.44	+ .020	+ .021
C.	.893	− .000	.859	1.0	1.52	0.44	− .029	− .028
C.	.948	+ .001	.917	1.0	1.49	0.43	+ .029	+ .030
C.	.913	+ .001	.882	1.0	1.45	0.42	− .006	− .005
C.	.928	− .002	.894	1.0	1.44	0.42	+ .006	+ .007
C.	31.897	−0.000	31.900	$+1.0\,x$	$+1.48\,y$	$+0.04\,z$	$= +0.012$	+0.011
C.	.861	+ .000	.865	1.0	1.43	0.06	− .023	− .024
C.	.894	− .000	.899	1.0	1.43	0.07	+ .011	+ .010
Assumed Mean Difference:			31.888					

Normals:

$$\begin{aligned} +12.00\,x - 0.84\,y - 5.14\,z &= -0.004 \\ -0.84\,x + 24.65\,y + 0.75\,z &= +0.011 \\ -5.14\,x + 0.75\,y + 3.55\,z &= +0.003 \end{aligned}$$

Solution:

	R	R	
$x =$	+0.0001	± 0.0074	Wt. 4.57
$y =$	+0.0004	± 0.0032	24.48
$z =$	+0.0010	± 0.0137	1.33

$[nn] = 0.00498$ $[vv] = 0.00497$ Prob. Error 1 Eq. $= \pm 0''.200$

$$\pi = +0''.005 \pm 0''.040$$

Fed. 263	B. D. +66°, 145	Mag. 7.4	R. A. $1^h\ 30.9^m$	Decl. +66° 11′	Pos. Angle.
a	+65°, 182	7.8	1 26.0	65 29	216°.0
b	+66°, 152	8.1	1 33.6	66 50	22°.3

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896	Jan.	11	6	6	3	19	245.985	199.128	+0.126	0.000	445.239
		13	6	12	3	19	.983	.155	.126	.000	.264
		18	5	40	3	27	.973	.146	.126	.000	.245
1902	July	1	19	24	3	62	246.123	199.168	+0.009	0.000	445.300
		3	20	51	2	67	.135	.163	.009	.000	.307
		10	20	38	3	60	.131	.168	.009	.000	.308
		11	20	9	3	61	.110	.163	.009	.000	.282
		12	20	41	3	64	.110	.156	.009	.000	.275
1903	Mar.	1	6	20	4	30	246.112	199.161	−0.003	0.000	445.270
		6	6	35	2	41	.099	.129	.003	.000	.226
		15	7	5	4	43	.136	.169	.004	.000	.301
		26	8	2	4	48	.094	.137	.004	.000	.227
		29	7	56	4	56	.103	.149	.004	.000	.248
							Assumed Annual Proper Motion and Mean Sum :		+0.018	0.000	445.269

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	46.857	+0.003	46.986	$+1.0\,x$	$-1.22\,y$	$-6.97\,z$	$= +0.028$	+0.020
E.	.828	+ .001	.955	1.0	1.25	6.96	− .003	− .011
E.	.827	+ .002	.955	1.0	1.33	6.95	− .003	− .010
S.	46.955	−0.003	46.961	$+1.0\,x$	$+0.83\,y$	$-0.50\,z$	$= +0.003$	−0.003
S.	.972	− .004	.977	1.0	0.89	0.49	+ .019	+ .013
S.	.963	− .004	.968	1.0	1.10	0.48	+ .010	+ .003
S.	.947	− .001	.955	1.0	1.12	0.48	− .003	− .010
S.	.954	− .001	.962	1.0	1.15	0.47	+ .004	− .003
S.	46.951	−0.000	46.948	$+1.0\,x$	$-1.88\,y$	$+0.16\,z$	$= -0.010$	−0.007
S.	.970	+ .004	.971	1.0	1.87	0.18	+ .013	+ .017
S.	.967	− .003	.960	1.0	1.82	0.20	+ .002	+ .005
S.	.957	+ .004	.957	1.0	1.72	0.23	− .001	+ .000
S.	.954	+ .002	.952	1.0	1.68	0.24	− .006	− .006

Assumed Mean Difference : 46.958

Normals :

			R	
$+13.00\,x$	$-7.68\,y$	$-22.29\,z$	$= +0.053$	Wt. 8.8
-7.68	$+26.20$	$+22.19$	$= +0.005$	20.9
-22.29	$+22.19$	$+146.70$	$= -0.169$	104.7

Solution :

	R	R	
$x =$	$+0.0037$	± 0.0025	
$y =$	$+0.0021$	± 0.0016	
$z =$	-0.0009	± 0.0007	

$[nn] = 0.00161$ $\quad [vv] = 0.00132$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.098$

$$\pi = +0''.027 \pm 0''.020$$

41 H. Androm.	B. D. +41°, 328	Mag. 5.3	R. A. $1^h\ 33.0^m$	Decl. +41° 53′	Pos. Angle.
a	+41°, 314	8.3	1 28.1	41 12	233°.6
b	+42°, 378	8.6	1 39.4	42 28	64°.4

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Aug. 27	22	25	4	71	323.134	372.896	0.000	0.000	696.030
	Sept. 1	21	42	4	64	.160	.898	.000	.000	.058
	2	22	23	4	65	.160	.933	.000	.000	.093
	4	21	33	3	50	.160	.918	.000	.000	.078
	5	21	59	2	53	.151	.914	.000	.000	.065
1903	Jan. 1	6	27	4	29	323.167	372.927	0.000	0.000	696.094
	9	6	23	2	19	.107	.886	.000	.000	695.993
	12	5	24	3	13	.139	.859	.000	.000	.998
	19	6	55	4	8	.140	.899	.000	.000	696.039
	Feb. 14	6	36	3	26	.148	.871	.000	.000	.019
	22	5	38	1	26	.162	.884	.000	.000	.046
1903	Aug. 21	21	41	2	63	323.208	372.861	0.000	0.000	696.069
	Sept. 2	21	41	2	62	.205	.854	.000	.000	.059
	6	22	7	1	56	.183	.839	.000	.000	.022
	Assumed Annual Proper Motion and Mean Sum :							0.000	0.000	696.047

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	49.762	+0.001	49.763	$+1.0\,x$	$-1.83\,y$	$-0.35\,z$ =	+0.016	+0.004
S.	.738	− .001	.737	1.0	1.75	0.33	− .010	− .021
S.	.773	− .003	.770	1.0	1.73	0.33	+ .023	+ .012
S.	.758	− .002	.756	1.0	1.70	0.33	+ .009	− .002
S.	.763	− .001	.762	1.0	1.69	0.32	+ .015	+ .005
S.	49.760	−0.003	49.757	$+1.0\,x$	$+1.64\,y$	$+0.00\,z$ =	+0.010	+0.006
S.	.779	+ .004	.783	1.0	1.78	0.02	+ .036	+ .032
S.	.720	+ .003	.723	1.0	1.81	0.03	− .024	− .027
S.	.759	+ .001	.760	1.0	1.88	0.05	+ .013	+ .011
S.	.723	+ .002	.725	1.0	1.88	0.12	− .022	− .016
S.	.722	+ .000	.722	1.0	1.78	0.14	− .025	− .016
S.	49.653	−0.002	49.651	$+1.0\,x$	$-1.90\,y$	$+0.64\,z$ =	−0.096	+0.000
S.	.649	− .001	.648	1.0	1.73	0.67	− .099	− .001
S.	.656	+ .002	.658	1.0	1.67	0.67	− .089	+ .009
	Assumed Mean Difference :		49.747					

Normals :

			R
$+14.00\,x$	$-3.23\,y$	$+0.68\,z$ =	−0.243
-3.23	$+43.91$	$+0.06$ =	+0.386
$+0.68$	$+0.06$	$+1.89$ =	−0.212

Solution :

	R	R	
x =	−0.0102	± 0.0030	Wt. 13.5
y =	+0.0085	± 0.0017	43.1
z =	−0.1086	± 0.0080	1.9

$[nn] = 0.03138$ $[vv] = 0.00313$ Prob. Error 1 Eq. = ± 0".140

$\pi = +\ 0".108 \pm 0".021$

107 Piscium	B. D. +19°, 279	Mag. 5.3	R. A. 1^h 34.6^m	Decl. +19° 34′	Pos. Angle.
a	+18°, 221	8.2	1 33.0	18 39	293°.3
b	+20°, 283	8.2	1 39.2	20 27	50°.8

Date.	Sid. Time.	Def.	Temp.	Distance *a*.	Distance *b*.	P. M. Corrections.		Corrected Sum.
	h. m.		°	R	R	R	R	R
1893 Jan. 20	4 24	2–3	14	283.548	398.766	—0.111	+0.102	682.305
22	4 24	2	15	.607	.731	.111	.101	.328
25	4 36	2–3	30	.587	.760	.110	.101	.338
1893 Sept. 4	22 52	3	56	283.605	398.720	—0.075	+0.069	682.319
7	22 55	3	59	.601	.707	.075	.068	.301
8	22 50	3	55	.559	.768	.075	.068	.320
1901 Jan. 13	4 15	3	23	283.145	399.169	+0.345	—0.315	682.344
22	4 43	2–3	26	.134	.123	.346	.316	.287
29	5 23	2	22	.140	.142	.347	.317	.312
1901 Oct. 11	23 0	2–3	58	283.118	399.161	+0.387	—0.353	682.313
15	22 45	2–3	49	.122	.187	.388	.354	.343
16	22 51	2–3	54	.113	.182	.388	.354	.329
1902 Jan. 20	4 54	2–3	24.5	283.055	399.145	+0.402	—0.366	682.236
23	5 15	3	29.5	.085	.141	.402	.367	.261
24	4 36	2	29.5	.057	.158	.403	.367	.251
25	4 52	2	29	.058	.172	.403	.367	.266
27	5 24	3–4	29	.111	.180	.403	.367	.327
1902 Aug. 23	22 36	3	59	283.057	399.206	+0.436	—0.397	682.302
25	22 24	3	62	.051	.224	.436	.398	.313
26	22 31	3	64	.050	.223	.436	.398	.311
28	22 41	4	63	.052	.226	.437	.398	.317
Sept. 2	23 6	4	65	.064	.217	.437	.399	.319
1903 Jan. 18	4 33	3	11	283.017	399.244	+0.459	—0.419	682.301
21	5 20	4	36	.021	.265	.459	.419	.326
Feb. 6	5 46	3	30	.008	.233	.462	.421	.282
9	4 55	4	32	.028	.253	.462	.422	.321
10	4 48	3	36	.007	.254	.462	.422	.301
12	4 50	3	42	.008	.249	.463	.422	.298
14	4 55	3	28	.001	.232	.463	.422	.274
25	6 1	3	28	282.998	.252	.465	.424	.291
Assumed Annual Proper Motion and Mean Sum:						—0.057	+0.052	682.303

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.					Residuals.
	R	R	R				R		R
E.	115.218	—0.000	115.431	$+1.0\,x$	$+1.63\,y$	$-1.95\,z$	= +0.093	Wt. ½	+0.088
E.	.124	— .004	.332	1.0	1.63	1.94	— .006	½	— .011
E.	.173	— .006	.378	1.0	1.62	1.93	+ .040	½	+ .035
E.	115.115	—0.003	115.256	$+1.0\,x$	$-1.32\,y$	$-1.32\,z$	= —0.082	½	—0.060
E.	.106	+ .000	.249	1.0	1.26	1.31	— .089	½	— .067
E.	.209	— .003	.349	1.0	1.24	1.31	+ .011	½	+ .033

107 Piscium — *Continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
E.	116.024	—0.007	115.357	+1.0 x	+1.59 y	+6.04 z	= +0.019	+0.013
E.	115.989	+ .003	.330	1.0	1.63	6.06	— .008	— .014
E.	116.002	— .002	.336	1.0	1.61	6.08	— .002	— .008
E.	116.043	—0.002	115.301	+1.0 x	—0.44 y	+6.78 z	= —0.037	—0.025
E.	.065	— .007	.316	1.0	0.32	6.79	— .022	— .011
E.	.069	— .004	.323	1.0	0.29	6.79	— .015	— .004
E.	116.090	+0.011	115.333	+1.0 x	+1.63 y	+7.05 z	= —0.005	—0.012
E.	.056	+ .007	.294	1.0	1.62	7.06	— .044	— .051
E.	.101	+ .009	.340	1.0	1.62	7.07	+ .002	— .005
E.	.114	+ .006	.350	1.0	1.62	7.07	+ .012	+ .005
E.	.069	— .004	.295	1.0	1.61	7.07	— .043	— .050
S.	116.149	+0.000	115.316	+1.0 x	—1.49 y	+7.64 z	= —0.022	+0.000
S.	.173	— .002	.337	1.0	1.46	7.65	— .001	+ .021
S.	.173	— .001	.338	1.0	1.44	7.65	+ .000	+ .022
S.	.174	— .002	.337	1.0	1.42	7.66	— .001	+ .021
S.	.153	— .003	.314	1.0	1.34	7.67	— .024	— .002
S.	116.227	+0.000	115.349	+1.0 x	+1.59 y	+8.05 z	= +0.011	+0.004
S.	.244	— .004	.362	1.0	1.60	8.06	+ .024	+ .017
S.	.225	+ .004	.346	1.0	1.59	8.10	+ .008	+ .001
S.	.225	— .003	.338	1.0	1.57	8.11	+ .000	— .007
S.	.247	+ .000	.363	1.0	1.56	8.11	+ .025	+ .018
S.	.241	+ .001	.357	1.0	1.54	8.12	+ .019	+ .013
S.	.231	+ .005	.351	1.0	1.52	8.12	+ .013	+ .007
S.	.254	+ .002	.367	1.0	1.37	8.15	+ .029	+ .023

Assumed Mean Difference: 115.338

The observations in 1893 were "Half-sets" of 8 pointings and have been given half weight.

Normals:

$$\begin{aligned} +27.00\,x + 17.60\,y + 172.07\,z &= -0.077 \\ +17.60\,x + 56.95\,y + 122.39\,z &= +0.384 \\ +172.07\,x + 122.39\,y + 1324.29\,z &= -0.340 \end{aligned}$$

Solution:

$$\begin{aligned} x &= -0.0105 \pm 0.0083 \quad \text{Wt. } 4.6 \\ y &= +0.0095 \pm 0.0026 \quad 45.0 \\ z &= +0.0001 \pm 0.0012 \quad 222.5 \end{aligned}$$

$[nn] = 0.02276$ $[p.vv] = 0.01809$ Prob. Error 1 Eq. of Wt. 1 $= \pm 0''.228$

$$\pi = +0''.120 \pm 0''.034$$

From Elkin's observations: $y = +0.0158 - 0.96\,z$ Wt. 16.7 Prob. Error 1 Eq. $= \pm 0''.248$

From Smith's observations: $y = +0.0085 - 0.15\,z$ 27.2 Prob. Error 1 Eq. $= \pm 0.095$

$$\pi = +0''.196 \pm 0''.060 \text{ E.}$$
$$\pi = +0.107 \pm 0.018 \text{ S.}$$

Piazzi 1^h, 159	B. D. +63°, 238	Mag. 6.1	R. A. 1^h 37.3^m	Decl. +63° 8′	Pos. Angle.
a	+62°, 274	6.5	1 25.6	62 20	239°.8
b	+63°, 265	5.5	1 49.0	63 55	59°.2

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	[Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896	Jan. 11	5	36	3	19	444.890	429.486	+0.263	−0.157	874.482
	15	5	53	3	17	.850	.490	.263	.156	.447
	18	6	7	3	27	.890	.510	.263	.156	.507
1902	June 27	20	59	3	58	445.156	429.353	+0.019	−0.012	874.516
	July 1	20	0	3	62	.162	.363	.019	.012	.532
	10	21	2	3	60	.166	.393	.018	.011	.566
	11	20	38	3	61	.177	.378	.018	.011	.562
	12	20	15	3	63	.142	.376	.017	.011	.524
1903	Feb. 10	6	8	3	35	445.156	429.355	−0.004	+0.003	874.510
	Mar. 2	5	54	3	34	.152	.331	.006	.004	.481
	12	6	27	3	44	.141	.337	.007	.004	.475
	13	6	46	3	49	.150	.333	.008	.005	.480
	26	8	27	4	48	.139	.312	.009	.005	.447
	Assumed Annual Proper Motion and Mean Sum:							+0.038	−0.023	874.502

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
E.	15.404	+0.000	15.824	+1.0 x	−1.22 y	−6.97 z	= +0.019	+0.023
E.	.360	+ .001	.780	1.0	1.28	6.96	− .025	− .021
E.	.380	− .000	.799	1.0	1.33	6.95	− .006	− .002
S.	15.803	−0.000	15.834	+1.0 x	+1.49 y	−0.51 z	= +0.029	+0.018
S.	.799	− .001	.829	1.0	1.55	0.50	+ .024	+ .013
S.	.773	− .001	.801	1.0	1.70	0.48	− .004	− .016
S.	.799	− .001	.827	1.0	1.72	0.48	+ .022	+ .010
S.	.766	− .000	.794	1.0	1.74	0.47	− .011	− .023
S.	15.801	−0.000	15.794	+1.0 x	−1.96 y	+0.11 z	= −0.011	−0.008
S.	.821	+ .000	.811	1.0	1.80	0.17	+ .006	+ .008
S.	.804	+ .000	.793	1.0	1.65	0.19	− .012	− .010
S.	.817	+ .000	.804	1.0	1.64	0.20	− .001	+ .001
S.	.827	+ .001	.814	1.0	1.37	0.23	+ .009	+ .009
	Assumed Mean Difference:		15.805					

Normals:

			R	
+13.00 x	− 4.05 y	− 22.42 z	= +0.039	
− 4.05	+32.77	+ 21.16	= +0.130	
−22.42	+21.16	+146.68	= +0.053	

Solution:

	R	R	
x	= +0.0052	± 0.0036	Wt. 9.5
y	= +0.0042	± 0.0020	29.6
z	= +0.0005	± 0.0011	101.6

$[nn] = 0.00344$ $[vv] = 0.00260$ Prob. Error 1 Eq. $= \pm 0''.139$

$\pi = +0''.053 \pm 0''.025$

Brad. 3227	B. D. +67°, 191	Mag. 7.8	R. A. 2h 3.9m	Decl. +67° 0′	Pos. Angle.
a	+66°, 175	7.2	1 48.2	66 20	247°.3
b	+68°, 166	7.5	2 10.8	68 6	31°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896	Jan. 13	5 43	3	20	480.853	362.157	+0.220	+0.042	843.272
	15	6 16	3	16	.835	.109	.220	.042	.206
	Feb. 2	7 33	3	28	.855	.133	.219	.042	.249
1902	July 1	20 36	3	62	481.118	362.192	+0.016	+0.093	843.329
	3	21 23	2	68	.078	.196	.016	.003	.293
	10	21 28	3	60	.134	.209	.015	.003	.361
	11	20 7	3	61	.117	.192	.015	.003	.327
	12	21 11	3	63	.126	.214	.015	.003	.358
1903	Feb. 10	6 37	3	35	481.080	362.180	−0.003	−0.001	843.256
	22	6 50	1	23	.090	.175	.005	.001	.259
	Mar. 2	6 30	3	33	.073	.188	.005	.001	.255
	12	6 57	4	43	.063	.171	.006	.001	.227
	13	7 15	3	48	.056	.169	.006	.001	.218
		Assumed Annual Proper Motion and Mean Sum:					+0.032	+0.006	843.278

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	118.696	+0.001	118.875	+1.0 x	−1.36 y	−6.96 z =	−0.032	−0.023
E.	.726	+ .010	.914	1.0	1.41	6.96	+ .007	+ .016
E.	.722	+ .004	.903	1.0	1.72	6.91	− .004	+ .007
S.	118.926	−0.007	118.932	+1.0 x	+1.07 y	−0.50 z =	+0.025	+0.014
S.	.882	− .002	.893	1.0	1.12	0.50	− .014	− .025
S.	.925	− .012	.925	1.0	1.32	0.48	+ .018	+ .006
S.	.925	− .007	.930	1.0	1.34	0.48	+ .023	+ .010
S.	.912	− .011	.913	1.0	1.36	0.47	+ .006	− .007
S.	118.900	+0.003	118.901	+1.0 x	−1.81 y	+0.11 z =	−0.006	+0.004
S.	.915	+ .003	.914	1.0	1.87	0.15	+ .007	+ .017
S.	.885	+ .003	.884	1.0	1.82	0.17	− .023	− .013
S.	.892	+ .007	.894	1.0	1.78	0.19	− .013	− .003
S.	.887	+ .008	.890	1.0	1.77	0.20	− .017	− .007
	Assumed Mean Difference:		118.907					

Normals:

$$+13.00\,x - 7.33\,y - 22.44\,z = -0.023$$
$$-7.33 + 30.97 + 26.69 = +0.208$$
$$-22.44 + 26.69 + 145.95 = +0.165$$

Solution: $x = +0.0027 \pm 0.0034$ Wt. 9.1
$y = +0.0072 \pm 0.0020$ 25.0
$z = +0.0002 \pm 0.0010$ 99.9

$[nn] = 0.00388$ $[vv] = 0.00233$ Prob. Error 1 Eq. $= \pm 0''.133$

$$\pi = +0''.091 \pm 0''.025$$

Lal. 4141	B. D. +23°, 303	Mag. 6.5	R. A. 2^h 7.1^m	Decl. +23° 37′	Pos. Angle.
a	+23°, 297	6.7	2 4.4	23 30	259°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	P. M. Correction. R	Corrected Sum from δ Trianguli. R
1902	Sept. 10	21 44	2	57	179.506	+0.009	976.801
	14	21 40	3	53	.511	.008	.818
	15	21 29	2	54	.493	.008	.824
1903	Jan. 1	5 57	3–4	30	179.510	—0.000	976.846
	8	5 2	1–2	19	.496	.001	.763
	9	6 1	2	19	.504	.001	.728
	12	4 45	3	14	.496	.001	.757
	14	4 44	–	21	.492	.001	.792
	17	6 9	3	35	.513	.001	.732
1903	Aug. 7	22 47	3–4	54	179.519	—0.016	976.834
	12	22 45	3	57	.527	.017	.773
	14	22 35	3	60	.537	.017	.810
					Assumed Annual Proper Motion and Mean Sum:	+0.027	976.781

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
S.	—0.002	179.513	+1.0 x	+0.73 y	−0.31 z	= +0.007	+0.005
S.	— .005	.514	1.0	0.68	0.30	+ .008	+ .006
S.	— .006	.495	1.0	0.67	0.29	— .011	— .010
S.	—0.010	179.500	+1.0 x	−0.87 y	+0.00 z	= —0.006	—0.005
S.	+ .005	.500	1.0	0.91	0.02	— .006	— .005
S.	+ .011	.514	1.0	0.91	0.02	+ .008	+ .009
S.	+ .006	.501	1.0	0.93	0.03	— .005	— .004
S.	— .001	.490	1.0	0.93	0.04	— .016	— .015
S.	+ .011	.523	1.0	0.94	0.05	+ .017	+ .018
S.	—0.008	179.495	+1.0 x	+0.98 y	+0.60 z	= —0.011	—0.013
S.	+ .003	.513	1.0	0.96	0.61	+ .007	+ .005
S.	— .004	.516	1.0	0.95	0.62	+ .010	+ .008

Assumed Mean Distance: 179.506

Normals:

			R	
+ 12.00 x	− 0.52 y	+ 1.09 z	= + 0.002	Wt. 10.9
− 0.52	+ 9.26	+ 0.98	= + 0.015	8.4
+ 1.09	+ 0.98	+ 1.38	= + 0.004	1.2

Solution:

	R	R
x =	+ 0.0001	± 0.0024
y =	+ 0.0014	± 0.0028
z =	+ 0.0017	± 0.0073

$[nn] = 0.00121$ $[vv] = 0.00111$ Prob. Error 1 Eq. = ± 0″.100

$\pi = + 0''.018 \pm 0''.035$

δ Trianguli	B. D. +33°, 395	Mag. 5.0	R. A. 2h 8.2m	Decl. +33° 35′	Pos. Angle.
a	+32°, 390	7.0	2 1.8	32 40	237°.6
b	+34°, 425	7.0	2 14.8	34 47	47°.8

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Sept.	8	21 26	2	64	462.144	514.642	+0.021	−0.028	976.779
		10	21 6	2	58	.136	.672	.021	.028	.801
		14	21 26	3	54	.146	.679	.020	.027	.818
		15	21 11	2	55	.146	.684	.020	.026	.824
1903	Jan.	1	7 12	3–4	29	462.188	514.658	−0.000	+0.000	976.846
		8	5 27	1–2	19	.143	.619	.001	.002	.763
		9	6 55	2	18	.120	.607	.001	.002	.728
		12	5 59	3	13	.108	.648	.002	.003	.757
		14	5 24	–	21	.140	.651	.003	.004	.792
		17	5 37	3	35	.104	.626	.003	.005	.732
1903	Aug.	7	21 44	3–4	54	462.221	514.600	−0.041	+0.054	976.834
		12	21 48	3	59	.186	.573	.041	.055	.773
		14	21 48	3	61	.209	.587	.042	.056	.810
							Assumed Annual Proper Motion and Mean Sum :	+0.068	−0.090	976.789

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	52.498	+0.001	52.450	+1.0 *x*	−1.66 *y*	−0.31 *z*	= −0.035	−0.025
S.	.536	− .001	.486	1.0	1.62	0.31	+ .001	+ .010
S.	.533	− .002	.484	1.0	1.55	0.30	− .001	+ .007
S.	.538	− .002	.490	1.0	1.54	0.29	+ .005	+ .013
S.	52.470	−0.003	52.467	+1.0 *x*	+1.50 *y*	+0.00 *z*	= −0.018	−0.039
S.	.476	+ .001	.480	1.0	1.62	0.02	− .005	− .027
S.	.487	+ .003	.493	1.0	1.64	0.02	+ .008	− .014
S.	.540	+ .002	.547	1.0	1.69	0.03	+ .062	+ .040
S.	.511	− .000	.518	1.0	1.72	0.04	+ .033	+ .010
S.	.522	+ .003	.533	1.0	1.76	0.05	+ .048	+ .025
S.	52.379	−0.002	52.472	+1.0 *x*	−1.95 *y*	+0.60 *z*	= −0.013	−0.006
S.	.387	+ .001	.484	1.0	1.94	0.61	− .001	+ .007
S.	.378	− .001	.475	1.0	1.93	0.62	− .010	− .002
			Assumed Mean Difference :	52.485				

Normals :

			R	
+ 13.00 *x*	− 2.26 *y*	+ 0.78 *z*	= + 0.074	
− 2.26	+ 37.91	− 1.36	= + 0.320	
+ 0.78	− 1.36	+ 1.48	= − 0.000	

Solution :

	R	R	
x =	+ 0.0069	± 0.0045	Wt. 12.5
y =	+ 0.0091	± 0.0026	36.6
z =	+ 0.0049	± 0.0137	1.4

$[nn] = 0.00938$ $[vv] = 0.00580$ Prob. Error 1 Eq. = ± 0.205

$$\pi = + 0''.115 \pm 0''.034$$

Piazzi 2^h, 123	B. D. +6°, 398	Mag. 6.5	R. A. 2^h 28.2^m	Decl. +6° 10′	Pos. Angle.
a	+6°, 380	7.8	2 24.6	6 4	261°.7
b	+6°, 405	8.5	2 31.0	6 19	81°.2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Jan.	20	4 43	2–3	13	260.518	199.723	+0.306	−0.298	460.259
		22	4 40	2	15	.536	.639	.304	.296	.193
		25	4 50	2–3	30	.523	.666	.303	.295	.207
1893	Sept.	4	23 13	3	55	260.633	199.534	+0.207	−0.202	460.172
		7	23 12	3	59	.641	.538	.205	.200	.184
		8	23 6	3	54.5	.719	.457	.205	.200	.181
1901	Jan.	13	4 42	3	23	261.785	198.464	−0.948	+0.924	460.225
		22	5 4	2–3	25	.799	.460	.951	.927	.235
		29	5 5	2	22	.770	.438	.954	.930	.184
1901	Oct.	11	23 30	2–3	58	261.900	198.345	−1.065	+1.037	460.217
		15	23 19	2	49	.915	.375	1.066	1.039	.263
		16	23 18	2–3	53	.941	.368	1.066	1.039	.282
1902	Jan.	20	5 18	2–3	24	261.909	198.291	−1.107	+1.079	460.172
		23	5 40	3	29	.906	.289	1.108	1.080	.167
		24	4 55	2	29	.910	.287	1.109	1.081	.169
		25	5 13	2	28.5	.910	.303	1.110	1.082	.185
1902	Aug.	23	23 10	3	59.5	262.038	198.188	−1.199	+1.169	460.196
		25	23 9	2–3	61	.056	.199	1.201	1.170	.224
		26	23 7	3–4	64	.053	.200	1.201	1.170	.222
		30	23 4	3	70	.043	.222	1.203	1.172	.234
	Sept.	10	23 6	2	55	.057	.234	1.207	1.177	.261
1903	Jan.	18	3 27	2	12	262.081	198.169	−1.264	+1.232	460.218
		21	4 27	3	36	.077	.172	1.265	1.233	.217
		30	4 2	3	28	.091	.161	1.269	1.236	.219
	Feb.	6	4 39	2	31	.083	.159	1.272	1.239	.209
		9	4 26	4	32	.086	.169	1.273	1.241	.223
		10	4 20	3	37	.087	.158	1.273	1.241	.213
		12	4 19	3	42	.093	.143	1.273	1.241	.204
		14	4 27	3	29	.077	.138	1.275	1.242	.182
						Assumed Annual Proper Motion and Mean Sum:		+0.157	−0.153	460.213

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R		Residuals. R
E.	60.795	−0.006	61.393	$+1.0\,x$	$-1.91\,y$	$-1.95\,z$ =	−0.047	Wt. ½	−0.072
E.	.897	+ .003	.500	1.0	1.91	1.94	+ .060	½	+ .035
E.	.857	+ .001	.456	1.0	1.92	1.93	+ .016	½	− .009
E.	61.099	+0.005	61.513	$+1.0\,x$	$+1.64\,y$	$-1.32\,z$ =	+0.073	½	+0.014
E.	.103	+ .004	.512	1.0	1.58	1.31	+ .072	½	+ .013
E.	[.262]	+ .004	[.671]	1.0	1.56	1.31	+ .231	0	[+ .172]

Piazzi 2^h, 123 — *Continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
E.	63.321	−0.002	61.447	+1.0 x	−1.85 y	+6.04 z =	+0.007	+0.014
E.	.339	− .003	.458	1.0	1.91	6.06	+ .018	+ .025
E.	.332	+ .004	.452	1.0	1.93	6.08	+ .012	+ .019
E.	63.555	−0.000	61.453	+1.0 x	+0.65 y	+6.78 z =	+0.013	−0.003
E.	.540	− .007	.428	1.0	.53	6.79	− .012	− .027
E.	.573	− .009	.459	1.0	.50	6.79	+ .019	+ .005
E.	63.618	+0.005	61.437	+1.0 x	−1.91 y	+7.05 z =	−0.003	+0.009
E.	.617	+ .006	.435	1.0	1.92	7.06	− .005	+ .007
E.	.623	+ .006	.439	1.0	1.92	7.07	− .001	+ .012
E.	.607	+ .004	.419	1.0	1.92	7.07	− .021	− .008
S.	63.850	+0.002	61.484	+1.0 x	+1.79 y	+7.64 z =	+0.044	+0.019
S.	.857	− .001	.485	1.0	1.75	7.65	+ .045	+ .020
S.	.853	− .001	.481	1.0	1.73	7.65	+ .041	+ .016
S.	.821	− .003	.443	1.0	1.68	7.66	+ .003	− .022
S.	.823	− .006	.433	1.0	1.50	7.69	− .007	− .030
S.	63.912	−0.001	61.415	+1.0 x	−1.88 y	+8.05 z =	−0.025	−0.008
S.	.905	− .001	.406	1.0	1.90	8.06	− .034	− .017
S.	.930	− .001	.424	1.0	1.91	8.08	− .016	+ .001
S.	.924	+ .001	.414	1.0	1.89	8.10	− .026	− .009
S.	.917	− .001	.402	1.0	1.88	8.11	− .038	− .021
S.	.929	− .000	.415	1.0	1.87	8.11	− .025	− .008
S.	.950	+ .001	.437	1.0	1.85	8.11	− .003	+ .014
S.	.939	+ .004	.426	1.0	1.83	8.12	− .014	+ .002

Assumed Mean Difference: 61.440

The observations in 1893 were "Half-sets" of 8 pointings, and have been given half weight excepting the last, which was rejected for unexplained discordance.

Normals:

			R
+ 25.50 x	− 19.50 y	+ 165.60 z =	+ 0.058
− 19.50	+ 77.03	− 130.56 =	+ 0.651
+ 165.60	− 130.56	+ 1272.33 =	− 0.474

Solution:

	R	R	
x =	+ 0.0375	± 0.0071	Wt. 3.8
y =	+ 0.0109	± 0.0018	62.0
z =	− 0.0041	± 0.0010	196.7

$[nn] = 0.01993$ $[p.vv] = 0.00902$ Prob. Error 1 Eq. of Wt. 1 = ± 0.″166

$$\pi = +0.''138 \pm 0.''022$$

From Elkin's observations	y = + 0.0096 + 0.42 z	Wt. 21.1	Prob. Error 1 Eq. = ± 0.″180
From Smith's observations	y = + 0.0138 + 0.12 z	39.2	Prob. Error 1 Eq. = ± 0.137

$$\pi = +0.''099 \pm 0.''039 \text{ E.}$$
$$\pi = +0.168 \pm 0.022 \text{ S.}$$

Lal. 4855	B. D. +30°, 421	Mag. 7.3	R. A. $2^h\ 30.0^m$	Decl. +30° 13′	Pos. Angle.
b	+30°, 433	6.9	2 33.4	30 19	81°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance δ. R	P. M. Correction. R	Corrected Sum from δ Trianguli. R
1902 Sept.	10	21 58	2	56	214.885	+0.013	976.801
	14	21 56	3	53	.884	.013	.818
	15	21 42	2	53	.895	.012	.824
1903 Jan.	1	7 37	3–4	28	214.895	−0.000	976.846
	8	5 51	1–2	18	.884	.001	.763
	9	7 22	2	18	.881	.001	.728
	12	6 23	3	12	.897	.001	.757
	14	6 49	–	21	.901	.002	.792
	17	6 26	3	35	.902	.002	.732
1903 Aug.	7	22 11	3–4	54	214.920	−0.025	976.834
	12	22 17	3	58	.919	.025	.773
	14	22 11	3	61	.940	.026	.810
						+0.042	976.781

Assumed Annual Proper Motion and Mean Sum: +0.042

Observer.	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	−0.003	214.895	+1.0 x	−0.80 y	−0.31 z =	−0.001	+0.000
S.	− .006	.891	1.0	0.76	0.30	− .005	− .006
S.	− .008	.899	1.0	0.75	0.29	+ .003	+ .002
S.	−0.013	214.882	+1.0 x	+0.81 y	+0.00 z =	−0.014	−0.014
S.	+ .006	.889	1.0	0.86	0.02	− .007	− .007
S.	+ .013	.893	1.0	0.87	0.02	− .003	− .004
S.	+ .007	.903	1.0	0.89	0.03	+ .007	+ .006
S.	− .001	.898	1.0	0.90	0.04	+ .002	+ .001
S.	+ .013	.913	1.0	0.92	0.05	+ .017	+ .016
S.	−0.010	214.885	+1.0 x	−0.99 y	+0.60 z =	−0.011	−0.012
S.	+ .004	.898	1.0	0.98	0.61	+ .002	+ .001
S.	− .005	.909	1.0	0.98	0.62	+ .013	+ .012

Assumed Mean Distance: 214.896

Normals:

			R
+ 12.00 x	− 0.01 y	+ 1.09 z	= + 0.003
− 0.01	+ 9.29	− 0.94	= + 0.003
+ 1.09	− 0.94	+ 1.38	= + 0.003

Solution:

	R	R	
x =	+ 0.0000	± 0.0020	Wt. 11.1
y =	+ 0.0005	± 0.0023	8.4
z =	+ 0.0031	± 0.0062	1.2

$[nn] = 0.00094$ $[vv] = 0.00089$ Prob. Error 1 Eq. = ± 0.″086

$\pi = + 0.″006 \pm 0.″030$

Lal. 5490–6	B. D. +61°, 513	Mag. 6.7	R. A. 2^h 52.3^m	Decl. +61° 9′	Pos. Angle.
a	+61°, 489	7.8	2 39.4	61 46	292°.0
b	+60°, 651	8.0	3 3.9	60 35	112°.4

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Jan. 30	7 50	3–4	25	472.626	430.023	+0.069	—0.080	902.638
	Feb. 23	8 22	3–4	28.5	.643	.039	.065	.075	.672
	26	8 2	2–3	34	.666	.032	.064	.074	.688
1903	July 15	22 15	3	53	472.718	430.012	+0.035	—0.041	902.724
	23	22 15	2–3	66	.687	429.999	.033	.038	.681
	24	22 29	3–4	62	.710	430.014	.033	.038	.719
	27	22 32	2	52	.716	429.986	.032	.037	.697
	Aug. 1	22 19	3	56.5	.716	430.003	.031	.036	.714
	2	22 33	3	60.5	.680	430.008	.031	.036	.683
1904	Jan. 10	6 28	2	15	472.716	429.964	—0.002	+0.002	902.680
	15	7 28	2–3	12	.716	.945	.003	.003	.661
	Feb. 10	6 16	1–2	15	.717	.939	.008	.010	.658
	Assumed Annual Proper Motion and Mean Sum:						+0.075	—0.087	902.684

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	42.603	+0.002	42.754	$+1.0\,x$	$-1.65\,y$	$-0.92\,z$	$=-0.010$	—0.002
C.	.604	+ .001	.745	1.0	1.35	0.86	— .019	— .012
C.	.634	— .000	.772	1.0	1.28	0.85	+ .008	+ .014
C.	42.706	—0.002	42.780	$+1.0\,x$	$+1.73\,y$	$-0.47\,z$	$=+0.016$	+0.010
C.	.688	+ .000	.759	1.0	1.74	0.44	— .005	— .011
C.	.696	— .002	.765	1.0	1.73	0.44	+ .001	— .005
C.	.730	— .001	.798	1.0	1.72	0.43	+ .034	+ .028
C.	.713	— .001	.779	1.0	1.70	0.42	+ .015	+ .009
C.	.672	+ .000	.739	1.0	1.70	0.42	— .025	— .031
C.	42.752	+0.000	42.748	$+1.0\,x$	$-1.63\,y$	$+0.02\,z$	$=-0.016$	—0.010
C.	.771	+ .001	.766	1.0	1.65	0.04	+ .002	+ .008
C.	.778	+ .001	.761	1.0	1.58	0.11	— .003	+ .002
	Assumed Mean Difference:		42.764					

Normals:

$$\begin{aligned} +12.00\,x + 1.18\,y - 5.08\,z &= -0.002 \\ +1.18\,x + 31.79\,y - 0.99\,z &= +0.122 \\ -5.08\,x - 0.99\,y + 3.46\,z &= +0.002 \end{aligned}$$

Solution:

	R	R	
$x =$	+0.0005	± 0.0054	Wt. 4.55
$y =$	+0.0039	± 0.0020	31.50
$z =$	+0.0024	± 0.0101	1.30

$[nn] = 0.00308$ $[vv] = 0.00260$ Prob. Error 1 Eq. $= \pm 0''.145$

$\pi = +0''.050 \pm 0''.026$

β Persei	B. D. +40°, 673	Mag. var.	R. A. $2^h\ 58.7^m$	Decl. +40° 24′	Pos. Angle.
a	+40°, 663	7.3	2 55.9	40 33	286°.5
b	+40°, 684	7.8	3 2.0	40 37	69°.2
c	+39°, 712	8.0	2 57.9	39 38	191°.5
d	+41°, 617	7.8	2 58.7	41 2	359°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	R	R
1892	Mar.	4	6	9	2–3	31.5	159.630	185.119	218.460	178.786	0.000	0.000	0.000	0.000
		5	6	23	2	32	.640	.127	—	—	.000	.000	—	—
		6	6	25	2–3	34	.637	.128	.507	.799	.000	.000	.000	.000
		7	5	55	2	40	.653	.147	.509	.793	.000	.000	.000	.000
		9	6	22	2–3	39	.642	.143	.461	.806	.000	.000	.000	.000
		13	6	43	3	25	.647	.141	.474	.788	.000	.000	.000	.000
		14	6	24	2	21	.645	.140	.491	.761	.000	.000	.000	.000
		15	6	52	2–3	24	.644	.131	—	—	.000	.000	—	—
1892	July	18	22	16	1–2	59	159.673	185.153	218.508	178.810	0.000	0.000	0.000	0.000
		20	22	19	3	58	.653	.135	.518	.793	.000	.000	.000	.000
		21	21	55	2–3	61.5	.669	.123	.501	.808	.000	.000	.000	.000
		23	22	3	2–3	66	.665	.146	.518	.792	.000	.000	.000	.000
		25	22	20	2	71	.647	.125	.487	.810	.000	.000	.000	.000
		26	22	53	3	74	.651	.143	.548	.760	.000	.000	.000	.000
1893	Feb.	8	6	29	3	14	159.640	185.124	218.506	178.789	0.000	0.000	0.000	0.000
		14	7	2	3	30	.656	.153	.531	.831	.000	.000	.000	.000
		20	6	48	–	55	.647	.125	.469	.819	.000	.000	.000	.000
		24	7	5	1–2	20	.649	.129	.484	.775	.000	.000	.000	.000
		26	7	13	2–3	24	.636	.135	.517	.810	.000	.000	.000	.000
	Mar.	1	7	12	2–3	28	.641	.135	.511	.796	.000	.000	.000	.000
1893	Aug.	7	22	18	3	62	159.656	185.151	218.532	178.782	0.000	0.000	0.000	0.000
		8	22	51	1–2	67	.662	.144	.519	.811	.000	.000	.000	.000
		9	23	23	2	65	.672	.128	.510	.838	.000	.000	.000	.000
		10	22	53	3	63	.682	.159	.525	.798	.000	.000	.000	.000
		11	22	53	2–3	66	.650	.150	.493	.802	.000	.000	.000	.000
		15	23	20	3	64	.619	.155	.519	.792	.000	.000	.000	.000
											0.000	0.000	0.000	0.000

Assumed Annual Proper Motion: 0.000 0.000 0.000 0.000

Observer.	Corrected Sum. $(a+b)$ R	Difference $(b-a)$ R	Scale Value Correction. R	Corrected Difference. R	Wt.	Equations of Condition.				Residuals. R	R
C.	344.749	25.489	+0.003	25.492	½	$+1.0x$	$+1.63y$	$-0.73z$	=	+0.004	+0.003
C.	.767	.487	+ .002	.489	1	1.0	1.62	0.73		+ .001	— .000
C.	.765	.491	+ .002	.493	1	1.0	1.60	0.72		+ .005	+ .004
C.	.800	.494	— .001	.493	1	1.0	1.59	0.72		+ .005	+ .004
C.	.785	.501	+ .000	.501	1	1.0	1.56	0.72		+ .013	+ .012
C.	.788	.494	+ .000	.494	1	1.0	1.49	0.71		+ .006	+ .005
C.	.785	.495	+ .000	.495	1	1.0	1.47	0.70		+ .007	+ .006
C.	.775	.487	+ .001	.488	1	1.0	1.45	0.70		+ .000	— .001
C.	344.826	25.480	—0.003	25.477	1	$+1.0x$	$-1.69y$	$-0.46z$	=	—0.011	—0.004
C.	.788	.482	+ .000	.482	1	1.0	1.71	0.45		— .006	+ .001
C.	.792	.454	— .000	.454	1	1.0	1.72	0.45		— .034	— .027
C.	.811	.481	— .002	.479	1	1.0	1.74	0.44		— .009	— .002
C.	.772	.478	+ .001	.479	1	1.0	1.77	0.44		— .009	— .002
C.	.794	.492	— .000	.492	1	1.0	1.77	0.44		+ .004	+ .011

β **Persei** — *Continued.*

Observer.	Corrected Sum. $(a+b)$ R	Difference. $(b-a)$ R	Scale Value Correction. R	Corrected Difference. R	Wt.	Equations of Condition.			R	Residuals. R
C.	344.764	25.484	+0.002	25.486	1	$+1.0\,x$	$+1.80\,y$	$+0.10\,z$	$=-0.002$	−0.009
C.	.809	.497	− .001	.496	1	1.0	1.77	0.12	+ .008	+ .002
C.	.772	.478	+ .001	.479	1	1.0	1.74	0.14	− .009	− .015
C.	.778	.480	+ .001	.481	1	1.0	1.71	0.15	− .007	− .013
C.	.771	.499	+ .001	.500	1	1.0	1.69	0.15	+ .012	+ .006
C.	.776	.494	+ .001	.495	1	1.0	1.66	0.16	+ .007	+ .001
C.	344.807	25.495	−0.001	5.494	1	$+1.0\,x$	$-1.83\,y$	$+0.60\,z$	$=+0.006$	+0.008
C.	.806	.482	− .001	.481	1	1.0	1.83	0.60	− .007	− .005
C.	.800	.456	− .001	.455	1	1.0	1.83	0.60	− .033	− .031
C.	.841	.477	− .004	.473	1	1.0	1.83	0.61	− .015	− .013
C.	.800	.500	− .001	.499	1	1.0	1.83	0.61	+ .011	+ .013
C.	.774	.536	+ .001	.537	1	1.0	1.83	0.62	+ .049	+ .051
Mean:	344.789	Assumed Mean Difference:		25.488						
	$(c+d)$	$(c-d)$								
C.	397.246	39.674	+0.005	39.679	½	$+1.0\,x'$	$-0.66\,y$	$-0.73\,z'$	$=-0.027$	−0.025
C.	.306	.708	− .000	.708	½	1.0	0.71	0.72	+ .002	+ .004
C.	.302	.716	+ .000	.716	½	1.0	0.73	0.72	+ .010	+ .013
C.	.267	.655	+ .003	.658	½	1.0	0.79	0.72	− .048	− .046
C.	.262	.686	+ .004	.690	½	1.0	0.89	0.71	− .016	− .014
C.	.252	.730	+ .005	.735	½	1.0	0.91	0.70	+ .029	+ .030
C.	397.318	39.698	−0.002	39.696	½	$+1.0\,x'$	$-0.71\,y$	$-0.46\,z'$	$=-0.010$	−0.009
C.	.311	.725	− .001	.724	½	1.0	0.66	0.45	+ .018	+ .019
C.	.309	.693	− .001	.692	½	1.0	0.63	0.45	− .014	− .013
C.	.310	.726	− .001	.725	½	1.0	0.58	0.44	+ .019	+ .020
C.	.297	.677	+ .000	.677	½	1.0	0.52	0.44	− .029	− .028
C.	.308	.788	− .001	.787	½	1.0	0.50	0.44	+ .081	+ .082
C.	397.295	39.717	+0.001	39.718	½	$+1.0\,x'$	$+0.03\,y$	$+0.10\,z'$	$=+0.012$	+0.010
C.	.362	.700	− .006	.694	½	1.0	−0.14	0.12	− .012	− .013
C.	.288	.650	+ .001	.651	½	1.0	0.19	0.14	− .055	− .056
C.	.259	.709	+ .004	.713	½	1.0	0.18	0.15	+ .007	+ .006
C.	.327	.707	− .002	.705	½	1.0	0.18	0.15	− .001	− .002
C.	.307	.715	− .000	.715	½	1.0	0.17	0.16	+ .009	+ .008
C.	397.314	39.750	−0.001	39.749	½	$+1.0\,x'$	$-0.08\,y$	$+0.60\,z'$	$=+0.043$	+0.041
C.	.330	.708	− .003	.705	½	1.0	0.15	0.60	− .001	− .003
C.	.348	.672	− .004	.668	½	1.0	0.12	0.60	− .038	− .040
C.	323	.727	− .002	.725	½	1.0	0.09	0.61	+ .019	+ .017
C.	.295	.691	+ .001	.692	½	1.0	0.06	0.61	− .014	− .016
C.	.311	.727	− .001	.726	½	1.0	+0.05	0.62	+ .020	+ .017
Mean:	397.302	Assumed Mean Difference:		39.706						

Normals:

					R		R	R	
$+25.50\,x$	$-3.58\,z$	$+0.00\,x'$	$+0.00\,z'$	$+0.58\,y$	$=-0.001$	*Solution:*	$x=+0.0006$	± 0.0026	Wt. 23.53
-3.58	$+7.33$	$+0.00$	$+0.00$	-8.91	$=+0.010$		$z=+0.0051$	± 0.0052	5.78
$+0.00$	$+0.00$	$+12.00$	-1.26	-4.75	$=+0.002$		$x'=+0.0015$	± 0.0038	11.29
$+0.00$	$+0.00$	-1.26	$+3.27$	$+2.30$	$=+0.010$		$z'=+0.0016$	± 0.0071	3.09
$+0.58$	-8.91	-4.75	$+2.30$	$+77.05$	$=+0.175$		$y=+0.0029$	± 0.0016	62.70

$[nn] = 0.01626$ $[p.vv] = 0.01571$ Prob. Error 1 Eq. of Wt. 1 $= \pm$ 0.″159

$\pi = +$ 0.″037 $\pm$ 0.″020

ι Persei	B. D. +49°, 857	Mag. 4.3	R. A. $2^h\ 58.6^m$	Decl. +49° 3′	Pos. Angle.
a	+48°, 814	8.5	2 48.9	48 56	265°.6
b	+49°, 900	7.5	3 8.5	49 14	83°.8

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P M. Corrections. R	R	Corrected Sum. R
1903	Feb.	12	6	11	1–2	41	457.447	455.960	+0.067	−0.113	913.361
		23	7	41	3–4	29	.462	.982	.065	.109	.400
		26	7	23	2–3	34.5	.465	.958	.064	.108	.379
1903	July	27	23	16	2	50	457.522	455.927	+0.032	−0.055	913.426
	Aug.	1	22	58	3	56	.500	.905	.031	.053	.383
		2	23	26	3	59	.521	.890	.031	.053	.389
		17	22	19	2–3	62	.514	.898	.029	.048	.393
		24	22	54	2	61	.520	.886	.027	.046	.387
	Sept.	1	21	37	—	62	.565	.924	.026	.043	.472
1904	Jan.	10	7	17	2	14	457.535	455.830	−0.002	+0.003	913.366
	Feb.	8	6	48	2	10	.524	.857	.007	.013	.387
		10	6	54	•3	15	.530	.848	.008	.014	.384
							Assumed Annual Proper Motion and Mean Sum:		+0.075	−0.127	913.394

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	1.487	0.000	1.667	$+1.0\,x$	$-1.93\,y$	$-0.89\,z$	$= -0.016$	+0.001
C.	.480	.000	.654	1.0	1.86	0.86	− .029	− .013
C.	.507	.000	.679	1.0	1.83	0.85	− .004	+ .012
C.	1.595	0.000	1.682	$+1.0\,x$	$+1.90\,y$	$-0.43\,z$	$= -0.001$	−0.016
C.	.595	.000	.679	1.0	1.94	0.42	− .004	− .019
C.	.631	.000	.715	1.0	1.94	0.42	+ .032	+ .017
C.	.616	.000	.693	1.0	1.98	0.38	+ .010	− .005
C.	.634	.000	.707	1.0	1.94	0.36	+ .024	+ .010
C.	.641	.000	.710	1.0	1.88	0.34	+ .027	+ .012
C.	1.705	0.000	1.700	$+1.0\,x$	$-1.65\,y$	$+0.02\,z$	$= +0.017$	+0.030
C.	.667	.000	.647	1.0	1.94	0.10	− .036	− .020
C.	.682	.000	.660	1.0	1.93	0.11	− .023	− .008

Assumed Mean Difference: 1.683

Normals:

			R
$+12.00\,x$	$+0.44\,y$	$-4.72\,z$	$= -0.003$
$+0.44$	$+43.07$	-0.08	$= +0.348$
-4.72	-0.08	$+3.20$	$= +0.004$

Solution:

	R	R	
$x =$	$+0.0000$	± 0.0053	Wt. 5.03
$y =$	$+0.0081$	± 0.0018	43.05
$z =$	$+0.0014$	± 0.0104	1.34

$[nn] = 0.00567$ $\quad [vv] = 0.00287$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.153$

$\pi = +0''.106 \pm 0''.023$

Lal. 5761	B. D. +25°, 495	Mag. 7.9	R. A. 2^h 59.9^m	Decl. +25° 48′	Pos. Angle.
a	+25°, 477	5.8	2 53.4	25 54	273°.8
b	+25°, 515	8.0	3 6.6	25 57	84°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Aug. 12	23 46	2	53.5	417.371	434.856	−0.005	+0.008	852.230
	17	23 46	2–3	60.5	.380	.867	.005	.008	.250
	24	0 11	2	59	.361	.854	.005	.007	.217
	Sept. 22	22 54	3	60.5	.375	.862	.004	.006	.239
1904	Jan. 15	6 47	2–3	14.5	417.363	434.839	+0.001	−0.001	852.202
	17	6 35	2–3	9.5	.361	.847	.001	.001	.208
	24	6 37	2	22.5	.315	.865	.001	.001	.180
	Feb. 3	6 10	—	13	.353	.831	.001	.002	.183
	15	7 21	2–3	11	.329	.835	.002	.002	.164
1904	Oct. 15	23 44	2	41	417.352	434.880	+0.011	−0.016	852.227
	17	23 32	—	38.5	.357	.885	.011	.016	.237
	24	23 50	3	38.5	.365	.872	.011	.016	.232
	Assumed Annual Proper Motion and Mean Sum:						−0.014	+0.020	852.214

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	17.485	−0.000	17.498	$+1.0x$	$-1.96y$	$-0.39z$ =	+0.001	−0.002
C.	.487	− .001	.499	1.0	1.96	0.38	+ .002	− .001
C.	.493	− .000	.505	1.0	1.91	0.36	+ .008	+ .005
C.	.487	− .001	.496	1.0	1.46	0.28	− .001	− .003
C.	17.476	+0.000	17.474	$+1.0x$	$+1.74y$	$+0.04z$ =	−0.023	−0.023
C.	.486	+ .000	.484	1.0	1.77	0.04	− .013	− .013
C.	.550	+ .001	.549	1.0	1.85	0.06	+ .052	+ .052
C.	.478	+ .001	.476	1.0	1.90	0.09	− .021	− .021
C.	.506	+ .001	.503	1.0	1.88	0.12	+ .006	+ .006
C.	17.528	−0.000	17.501	$+1.0x$	$-0.83y$	$+0.79z$ =	+0.004	+0.007
C.	.528	− .000	.501	1.0	0.76	0.79	+ .004	+ .007
C.	.507	− .000	.480	1.0	0.55	0.81	− .017	− .014
	Assumed Mean Difference:		17.497					

Normals:

			R
$+12.00x$	$-0.29y$	$+1.33z$ =	+0.002
-0.29	$+31.75$	$+1.54$ =	−0.012
$+1.33$	$+1.54$	$+2.42$ =	−0.011

Solution:

	R	R	
x =	+0.0007	± 0.0043	Wt. 11.23
y =	−0.0001	± 0.0026	30.66
z =	−0.0047	± 0.0099	2.19

$[nn] = 0.00427$ $[vv] = 0.00422$ Prob. Error 1 Eq. = ± 0″.184

$\pi = -0''.001 \pm 0''.033$

Weisse 3^h, 113	B. D. $+8°$, 482	Mag. 7.8	R. A. $3^h\ 6.9^m$	Decl. $+8°\ 27'$	Pos. Angle
a	$+7°$, 478	6.6	3 0.9	7 54	$250°.3$
b	$+9°$, 427	7.8	3 13.5	9 8	$67°.1$

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct. 10	1 30	3	42.5	452.449	496.338	+0.038	−0.042	948.783
	11	1 36	3	51	.462	.310	.038	.042	.768
	12	0 58	1–2	45.5	.450	.322	.038	.042	.768
1893	Mar. 1	6 37	2–3	28.5	452.473	496.364	+0.031	−0.035	948.833
	6	6 38	2	24.5	.453	.316	.031	.035	.765
	7	6 46	–	30	.474	.341	.031	.035	.811
1897	Jan. 23	6 25	2	20	452.526	496.276	−0.035	+0.039	948.806
	26	6 17	3–4	16.5	.521	.257	.035	.039	.782
	30	5 16	3–4	19	.516	.240	.035	.040	.761
1897	Aug. 13	0 5	2–3	61	452.555	496.257	−0.044	+0.050	948.818
	13	0 37	2–3	60	.542	.245	.044	.050	.803
	28	1 50	2–3	58	.542	.226	.045	.050	.773
						Assumed Annual Proper Motion and Mean Sum:	+0.017	−0.019	948.789

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	43.889	+0.000	43.809	$+1.0\,x$	$-0.95\,y$	$-2.23\,z$	$= +0.010$	+0.018
C.	.848	+ .001	.769	1.0	0.92	2.23	− .030	− .022
C.	.872	+ .001	.793	1.0	0.88	2.22	− .006	+ .002
C.	43.891	−0.002	43.823	$+1.0\,x$	$+1.75\,y$	$-1.84\,z$	$= +0.024$	+0.016
C.	.863	+ .001	.798	1.0	1.67	1.83	− .001	− .008
C.	.867	− .001	.800	1.0	1.66	1.82	+ .001	− .006
C.	43.750	−0.001	43.823	$+1.0\,x$	$+1.90\,y$	$+2.06\,z$	$= +0.024$	+0.012
C.	.736	+ .000	.810	1.0	1.92	2.07	+ .011	− .001
C.	.724	+ .001	.800	1.0	1.94	2.08	+ .001	− .012
C.	43.702	−0.001	43.795	$+1.0\,x$	$-1.99\,y$	$+2.61\,z$	$= -0.004$	+0.005
C.	.703	− .001	.796	1.0	1.99	2.61	− .003	+ .006
C.	.684	+ .001	.780	1.0	1.88	2.65	− .019	− .010
	Assumed Mean Difference:		43.799					

Normals:

			R	*Solution:*	R	R	
$+12.00\,x$	$+2.23\,y$	$+1.91\,z$	$= +0.008$	x	$= +0.0006$	± 0.0027	Wt. 11.76
$+2.23$	$+33.64$	-6.63	$= +0.185$	y	$= +0.0057$	± 0.0016	32.39
$+1.91$	-6.63	$+58.41$	$= +0.020$	z	$= +0.0010$	± 0.0012	56.64

$[nn] = 0.00269$ $\quad [vv] = 0.00164$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.115$

$$\pi = +0''.072 \pm 0''.020$$

Nova Persei — **R. A. 3h 21.4m** — **Decl. +43° 24′** — **Pos. Angle.**

a	B. D. +43°, 720	Mag. 7.6	3 17.1	43 8	251°.7
b	+43°, 766	8.0	3 25.5	43 21	93°.8

Date.	Sid. Time. h. m.	Def.	Temp. c	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R	Distance *ab*. R
1901 Feb. 24	8 52	2–3	15	231.348	212.672	0.000	0.000	444.020	—
25	8 48	2–3	26.5	.383	.705	.000	.000	.088	—
26	8 57	3	25	.349	.681	.000	.000	.030	436.399
27	8 45	2	17	.399	.710	.000	.000	.109	.409
28	8 40	2–3	17.5	.366	.683	.000	.000	.049	.388
Mar. 7	8 41	2	25	.366	.694	.000	.000	.060	.397
18	8 56	3	36	.374	.729	.000	.000	.103	.438
1901 July 19	22 46	3	66	231.386	212.714	0.000	0.000	444.100	436.415
21	22 39	2	74	.366	.700	.000	.000	.066	.407
23	22 49	1–2	66	.376	.709	.000	.000	.085	.407
27	23 1	2–3	61.5	.375	.706	.000	.000	.081	.396
30	22 52	1–2	73	.380	.696	.000	.000	.076	.418
Aug. 1	23 3	3	61	.378	.705	.000	.000	.083	.400
4	23 5	3	63.5	.358	.701	.000	.000	.059	.404
1901 Dec. 16	6 57	3	13	231.350	212.666	0.000	0.000	444.016	436.381
18	8 5	3	8.5	.378	.693	.000	.000	.071	.367
19	8 35	3	11.5	.349	.699	.000	.000	.048	.367
20	8 32	3	12	.380	.700	.000	.000	.080	.358
1902 Feb. 6	8 3	2	16	.375	.697	.000	.000	.072	.377
7	7 56	2	19.5	.356	.700	.000	.000	.056	.365
9	8 11	2–3	24	.365	.692	.000	.000	.057	.368
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	444.067	436.393

Observer.	Difference. R	Scale Value Corrections. I R	II R	Corrected Difference. I R	II R	Equations of Condition.				I R	II R	Residuals. I R
C.	18.676	+0.002	+0.000	18.678	18.676	+1.0 *x*	−1.89 *y*	+0.15 *z*	=	+0.006	+0.004	+0.004
C.	.678	− .001	+ .000	.677	.678	1.0	1.88	0.15		+ .005	+ .006	+ .004
C.	.668	+ .002	− .000	.670	.668	1.0	1.88	0.15		− .002	− .004	− .003
C.	.689	− .002	− .001	.687	.688	1.0	1.87	0.16		+ .015	+ .016	+ .014
C.	.683	+ .001	+ .000	.684	.683	1.0	1.86	0.16		+ .012	+ .011	+ .011
C.	.672	+ .000	− .000	.672	.672	1.0	1.80	0.18		+ .000	+ .000	− .001
C.	.645	− .002	− .002	.643	.643	1.0	1.65	0.21		− .029	− .029	− .030
C.	18.672	−0.001	−0.001	18.671	18.671	+1.0 *x*	+1.74 *y*	+0.55 *z*	=	−0.001	−0.001	+0.001
C.	.666	+ .000	− .001	.666	.665	1.0	1.78	0.55		− .006	− .007	− .003
C.	.667	− .001	− .001	.666	.666	1.0	1.80	0.56		− .006	− .006	− .003
C.	.669	− .001	− .000	.668	.669	1.0	1.84	0.57		− .004	− .003	− .001
C.	.684	− .000	− .001	.684	.683	1.0	1.87	0.57		+ .012	+ .011	+ .015
C.	.673	− .001	− .000	.672	.673	1.0	1.89	0.58		+ .000	+ .001	+ .003
C.	.657	+ .000	− .000	.657	.657	1.0	1.92	0.59		− .015	− .015	− .012
C.	18.684	+0.002	+0.001	18.686	18.685	+1.0 *x*	−0.92 *y*	+0.95 *z*	=	+0.014	+0.013	+0.014
C.	.685	− .000	+ .001	.685	.686	1.0	0.98	0.96		+ .013	+ .014	+ .013
C.	.650	+ .001	+ .001	.651	.651	1.0	1.01	0.96		− .021	− .021	− .020
C.	.680	− .001	+ .001	.679	.681	1.0	1.03	0.97		+ .007	+ .009	+ .007
C.	.678	− .000	+ .001	.678	.679	1.0	1.91	1.10		+ .006	+ .007	+ .006
C.	.656	+ .000	+ .001	.656	.657	1.0	1.92	1.10		− .016	− .015	− .016
C.	.673	+ .000	+ .001	.673	.674	1.0	1.93	1.11		+ .001	+ .002	+ .001
Assumed Mean Difference:				18.672	18.672							

Normals:

				I R	II R
+ 21.00 *x*	− 9.69 *y*	+ 12.28 *z*	=	−0.009	−0.007
− 9.69	+ 62.09	− 4 94	=	−0.051	−0.053
+ 12.28	− 4.94	+ 9.79	=	−0.004	−0.004

Solution:

	I R	II R	R	
x =	−0.0001	−0.0009	± 0.0036	Wt. 5.39
y =	−0.0009	−0.0010	± 0.0011	57.42
z =	−0.0013	+0.0015	± 0.0052	2.60

$[nn]$ = 0.002881 (I) 0.002898 (II) $[vv]$ = 0.002813 (I) 0.002836 (II) Prob. Error 1 Eq. = ± 0″.107

$\pi = -0''.012 \pm 0''.014$

10 Tauri	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	−0°, 561	8.5	3 24.7	−0 12	263°.5
b	−0°, 590	8.0	3 36.0	−0 3	88°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1903 Aug. 12	1 16	2	52	339.229	461.994	−0.016	+0.011	801.218
24	0 49	2	58.5	.226	462.009	.015	.010	.230
Sept. 11	0 44	1–2	58.5	.230	462.014	.013	.009	.240
18	0 59	3–4	49.5	.214	462.009	.012	.008	.219
1904 Jan. 15	6 7	2–3	16	339.194	461.996	+0.002	−0.001	801.191
17	5 54	3–4	10.5	.200	462.015	.002	.001	.216
24	5 57	2	23	.181	462.024	.003	.002	.206
25	5 52	2	11.5	.193	461.995	.003	.002	.189
Feb. 15	6 37	2–3	12	.196	462.018	.005	.003	.216
1904 Oct. 13	1 17	2–3	39.5	339.185	462.029	+0.033	−0.023	801.224
15	1 29	2	39	.180	462.053	.033	.023	.243
24	0 34	3	38.5	.180	462.007	.034	.023	.198
Assumed Annual Proper Motion and Mean Sum:						−0.042	+0.029	801.216

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	122.765	−0.000	122.792	$+1.0\,x$	$-1.97\,y$	$-0.39\,z$ =	−0.013	−0.011
C.	.783	− .002	.806	1.0	1.95	0.36	+ .001	+ .003
C.	.784	− .004	.802	1.0	1.75	0.31	− .003	− .002
C.	.795	− .000	.815	1.0	1.64	0.29	+ .010	+ .011
C.	122.802	+0.004	122.803	$+1.0\,x$	$+1.68\,y$	$+0.04\,z$ =	−0.002	−0.011
C.	.815	+ .000	.812	1.0	1.71	0.04	+ .007	− .002
C.	.843	+ .002	.840	1.0	1.80	0.06	+ .035	+ .026
C.	.802	+ .004	.801	1.0	1.83	0.07	− .004	− .013
C.	.822	+ .000	.814	1.0	1.92	0.12	+ .009	+ .000
C.	122.844	−0.001	122.787	$+1.0\,x$	$-1.05\,y$	$+0.78\,z$ =	−0.018	−0.004
C.	.873	− .004	.813	1.0	0.99	0.79	+ .008	+ .022
C.	.827	+ .003	.773	1.0	0.71	0.81	− .032	− .019
Assumed Mean Difference:			122.805					

Normals:

			R
$+12.00\,x$	$-1.12\,y$	$+1.36\,z$	$= -0.002$
-1.12	$+32.03$	$+0.92$	$= +0.128$
$+1.36$	$+0.92$	$+2.36$	$= -0.028$

Solution:

	R	R	
x =	+0.0019	± 0.0031	Wt. 11.14
y =	+0.0045	± 0.0018	31.43
z =	−0.0146	± 0.0069	2.18

$[nn] = 0.00307$ $[vv] = 0.00207$ Prob. Error 1 Eq. = ± 0.″129

$\pi = +0.″057 \pm 0.″023$

Lal. 6888–9 pr.	B. D. +41°, 750	Mag. 8.2	R. A. 3^h 37.1^m	Decl. +41° 1′	Pos. Angle.
a	+40°, 813	7.0	3 31.2	40 42	255°.7
b	+40°, 855	8.2	3 44.7	40 53	95°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896 Feb. 7	7 37	2	34.5	329.497	408.796	+0.253	−0.356	[738.190]
10	7 38	2	29	.472	.784	.252	.355	.153]
14	8 6	2–3	25.5	.537	.807	.252	.355	.241]
1902 Mar. 26	9 2	2–3	34.5	329.656	408.468	+0.057	−0.080	[738.101]
1903 Mar. 2	8 30	2	30	329.663	408.403	+0.027	−0.038	738.055
13	9 4	2–3	44	.703	.432	.026	.037	.124
15	8 29	3–4	39.5	.714	.439	.026	.036	.143
26	9 1	2	45.5	.694	.411	.025	.035	.095
1903 Aug. 12	0 31	2	52.5	329.720	408.374	+0.012	−0.018	738.088
17	23 2	2–3	61	.708	.398	.012	.017	.101
24	23 34	1–2	60	.703	.372	.011	.016	.070
Sept. 8	22 55	3	52	.719	.397	.010	.014	.112
11	23 39	1–2	60	.713	.400	.010	.014	.111
11	0 8	1–2	59	.709	.393	.010	.014	.100
1904 Feb. 8	7 31	2	9.5	329.697	408.338	−0.003	+0.004	738.036
10	7 32	3	14	.701	.360	.004	.005	.062
15	8 0	2–3	9.5	.718	.351	.004	.005	.070
Assumed Annual Proper Motion and Mean Sum:						+0.032	−0.045	738.090

The 1896 series made by Elkin and the isolated observation of 1902 by Chase were not utilized except for determination of approximate P. M. corrections, a complete and more symmetrical series being had without them.

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	78.740	+0.004	78.679	$+1.0\,x$	$+1.85\,y$	$-0.84\,z$ =	+0.023	+0.015
C.	.729	− .004	.662	1.0	1.76	0.81	+ .006	− .002
C.	.725	− .006	.657	1.0	1.74	0.80	+ .001	− .006
C.	.717	− .001	.656	1.0	1.54	0.77	+ .000	− .007
C.	78.654	+0.000	78.624	$+1.0\,x$	$-1.95\,y$	$-0.39\,z$ =	−0.032	−0.026
C.	.690	− .001	.660	1.0	1.96	0.38	+ .004	+ .010
C.	.669	+ .002	.644	1.0	1.95	0.36	− .012	− .006
C.	.678	− .002	.652	1.0	1.86	0.32	− .004	+ .002
C.	.687	− .002	.661	1.0	1.83	0.31	+ .005	+ .011
C.	.684	− .001	.659	1.0	1.83	0.31	+ .003	+ .009
C.	78.641	+0.006	78.654	$+1.0\,x$	$+1.96\,y$	$+0.10\,z$ =	−0.002	−0.003
C.	.659	+ .003	.671	1.0	1.95	0.11	+ .015	+ .014
C.	.633	+ .002	.644	1.0	1.94	0.12	− .012	− .013
Assumed Mean Difference:			78.656					

Normals:

			R
$+13.00\,x$	$+1.36\,y$	$-4.96\,z$ =	−0.005
+ 1.36	+44.92	− 0.98 =	+0.127
− 4.96	− 0.98	+3.34 =	−0.011

Solution:

	R	R	
x =	−0.0038	± 0.0027	Wt. 5.62
y =	+0.0028	± 0.0013	44.63
z =	−0.0081	± 0.0073	1.45

$[nn] = 0.00217$ $[vv] = 0.00171$ Prob. Error 1 Eq. = ± 0.″112

$\pi = +\,0.''035 \pm 0.''017$

Groom. 745	B. D. +75°, 154	Mag. 8.2	R. A. $3^h\ 42.7^m$	Decl. +75° 45′	Pos. Angle.
a	+75°, 151	8.2	3 37.0	75 34	242°.9
b	+75°, 160	7.5	3 47.4	76 0	48°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Mar. 12	8 25	1–2	39	114.277	108.623	0.000	+0.015	222.915
	15	9 10	3–4	38.5	.285	.596	.000	.014	.895
	26	9 45	2	43.5	.292	.616	.000	.014	.922
1903	Sept. 8	22 16	3	52	114.286	108.621	0.000	+0.006	222.913
	11	23 1	1–2	61	.298	.608	.000	.006	.912
	12	22 49	2	59.5	.308	.619	.000	.005	.932
	13	23 52	3–4	67	.290	.621	.000	.005	.916
	14	23 15	1–2	69.5	.298	.621	.000	.005	.924
	18	23 33	2	50.5	.295	.618	.000	.005	.918
1904	Mar. 23	10 4	3–4	41	114.286	108.629	0.000	−0.004	222.911
	24	9 27	2	34	.280	.631	.000	.004	.907
	29	9 5	1–2	30.5	.290	.631	.000	.004	.917
	Assumed Annual Proper Motion and Mean Sum:						0.000	+0.018	222.915

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	5.654	+0.000	5.639	$+1.0\,x$	$-1.93\,y$	$-0.81\,z$	$=-0.027$	−0.019
C.	.689	+ .000	.675	1.0	1.94	0.80	+ .009	+ .017
C.	.676	− .000	.662	1.0	1.91	0.77	− .004	+ .003
C.	5.665	+0.000	5.659	$+1.0\,x$	$+1.93\,y$	$-0.32\,z$	$=-0.007$	−0.013
C.	.690	+ .000	.684	1.0	1.93	0.31	+ .018	+ .011
C.	.689	− .000	.684	1.0	1.93	0.30	+ .018	+ .011
C.	.669	− .000	.664	1.0	1.94	0.30	− .002	− .008
C.	.677	− .000	.672	1.0	1 94	0.30	+ .006	− .000
C.	.677	− .000	.672	1.0	1.94	0.29	+ .006	− .000
C.	5.657	+0.000	5.661	$+1.0\,x$	$-1.93\,y$	$+0.22\,z$	$=-0.005$	+0.002
C.	.649	+ .000	.653	1.0	1.92	0.23	− .013	− .006
C.	.659	− .000	.663	1.0	1.88	0.24	− .003	+ .004
	Assumed Mean Difference:		5.666					

Normals:

			R
$+12.00\,x$	$+0.10\,y$	$-3.51\,z$	$=-0.004$
$+0.10$	$+44.51$	-0.25	$=+0.158$
-3.51	-0.25	$+2.60$	$=+0.001$

Solution:

	R	R	
x	$=-0.0002$	± 0.0029	Wt. 7.25
y	$=+0.0035$	± 0.0012	44.48
z	$=+0.0006$	± 0.0063	1.57

$[nn] = 0.00180$ $\quad [vv] = 0.00124$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.101$

$$\pi = +0''.044 \pm 0''.015$$

Lal. 7443	B. D. +34°, 796	Mag. 8.5	R. A. 3h 53.5m	Decl. +34° 55′	Pos. Angle.
a	+34°, 768	6.2	3 47.1	34 39	259°.7
b	+35°, 807	7.0	3 59.9	35 39	60°.2

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Mar. 12	7 42	1–2	40.5	385.071	420.633	+0.099	−0.060	805.743
	13	8 24	2–3	45	.080	.648	.099	.060	.767
	Apr. 5	8 58	2	32	.081	.602	.090	.055	.717
1903	Sept. 8	23 36	2	51.5	385.141	420.598	+0.039	−0.024	805.754
	12	23 27	2	59.5	.160	.606	.037	.022	.781
	13	0 27	3–4	66.5	.161	.591	.037	.022	.767
	14	23 59	3	68.5	.174	.603	.036	.022	.791
	16	23 17	3–4	69	.146	.605	.035	.021	.765
	18	0 14	3–4	50	.133	.582	.035	.021	.729
1904	Mar. 24	8 45	2	35	385.221	420.563	−0.028	+0.017	805.773
	29	8 30	1–2	31	.191	.548	.029	.018	.728
	30	9 0	2–3	32.5	.194	.545	.029	.018	.728
							+0.122	−0.074	805.753

Assumed Annual Proper Motion and Mean Sum: +0.122 −0.074 805.753

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	35.562	+0.000	35.403	$+1.0\,x$	$+1.86\,y$	$-0.81\,z$	$= +0.012$	+0.006
C.	.568	− .001	.408	1.0	1.85	0.81	+ .017	+ .011
C.	.521	+ .002	.378	1.0	1.47	0.74	− .013	− .018
C.	35.457	−0.000	35.394	$+1.0\,x$	$-1.92\,y$	$-0.32\,z$	$= +0.003$	+0.009
C.	.446	− .001	.386	1.0	1.89	0.30	− .005	+ .000
C.	.430	− .001	.370	1.0	1.88	0.30	− .021	− .015
C.	.429	− .002	.369	1.0	1.88	0.30	− .022	− .017
C.	.459	− .001	.402	1.0	1.86	0.29	+ .011	+ .016
C.	.449	+ .001	.394	1.0	1.84	0.29	+ .003	+ .008
C.	35.342	−0.001	35.386	$+1.0\,x$	$+1.71\,y$	$+0.23\,z$	$= -0.005$	−0.011
C.	.357	+ .001	.405	1.0	1.61	0.24	+ .014	+0.009
C.	.351	+ .001	.399	1.0	1.59	0.24	+ .008	+0.003

Assumed Mean Difference: 35.391

Normals:

$$\begin{aligned} +12.00\,x - 1.19\,y - 3.45\,z &= +0.002 \\ -1.19\,x + 38.29\,y + 0.44\,z &= +0.119 \\ -3.45\,x + 0.44\,y + 2.57\,z &= -0.000 \end{aligned}$$

Solution:

	R	R	
x	$= +0.0004$	± 0.0033	Wt. 7.36
y	$= +0.0031$	± 0.0015	38.17
z	$= -0.0001$	± 0.0071	1.58

$[nn] = 0.00197$ $[vv] = 0.00159$ Prob. Error 1 Eq. $= \pm 0''.114$

$\pi = +0''.039 \pm 0''.018$

Groom. 864	B. D. +41°, 931	Mag. 7.1	R. A. 4^h 31.3^m	Decl. +41° 51′	Pos. Angle.
a	+41°, 920	7.5	4 28.0	41 49	268°.4
b	+42°, 1033	7.5	4 33.8	42 8	57°.5

Date.		Sid. Time. h m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896	Feb. 7	7 59	2	34	179.593	155.966	+0.243	−0.082	335.667
	10	7 55	2	29	.595	.978	.242	.081	.681
	14	8 26	2–3	24.5	.610	.999	.241	.081	.716
1902	Mar. 25	9 21	3–4	35	179.842	155.894	−0.009	+0.003	335.730
	26	9 36	2–3	34.5	.837	.882	.009	.003	.713
	Apr. 11	9 14	2	44	.838	.886	.011	.004	.717
	13	9 25	3–4	45.5	.842	.883	.012	.004	.717
	14	9 39	2–3	39.5	.813	.894	.012	.004	.699
	15	9 41	2	41.5	.833	.879	.012	.004	.704
1902	Oct. 2	23 54	3	56	179.882	155.897	−0.031	+0.010	335.758
	6	0 25	3	52	.867	.901	.031	.010	.747
	6	1 35	3	51	.866	.887	.031	.010	.732
	8	0 44	3–4	50.5	.873	.878	.032	.011	.730
	9	0 46	3	42.5	.870	.882	.032	.011	.731
	10	0 53	2	42	.873	.889	.032	.011	.741
						Assumed Annual Proper Motion and Mean Sum:	+0.041	−0.014	335.719

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	23.627	+0.004	23.956	$+1.0\,x$	$-1.68\,y$	$-5.90\,z$	$= +0.016$	+0.012
E.	.617	+ .003	.943	1.0	1.71	5.89	+ .003	− .001
E.	.611	+ .000	.933	1.0	1.76	5.88	− .007	− .011
C.	23.948	−0.001	23.935	$+1.0\,x$	$-1.78\,y$	$+0.23\,z$	$= -0.005$	+0.002
C.	.955	+ .000	.943	1.0	1.77	0.23	+ .003	+ .010
C.	.952	+ .000	.937	1.0	1.54	0.27	− .003	+ .003
C.	.959	+ .000	.943	1.0	1.50	0.28	+ .003	+ .009
C.	.919	+ .001	.904	1.0	1.48	0.28	− .036	− .030
C.	.954	+ .001	.939	1.0	1.46	0.28	− .001	+ .005
C.	23.985	−0.003	23.941	$+1.0\,x$	$+1.74\,y$	$+0.75\,z$	$= +0.001$	+0.002
C.	.966	− .002	.923	1.0	1.68	0.76	− .017	− .016
C.	.979	− .001	.937	1.0	1.68	0.76	− .003	− .002
C.	.995	− .001	.951	1.0	1.65	0.77	+ .011	+ .012
C.	.988	− .001	.944	1.0	1.63	0.77	+ .004	+ .005
C.	.984	− .002	.939	1.0	1.61	0.77	− .001	+ .000
	Assumed Mean Difference:		23.940					

R

Normals: $+15.00\,x - 4.69\,y - 11.52\,z = -0.032$

$-4.69 + 40.72 + 35.48 = +0.030$

$-11.52 + 35.48 + 107.97 = -0.084$

R R

Solution: $x = -0.0029 \pm 0.0022$ Wt. 13.7

$y = +0.0019 \pm 0.0015$ 29.0

$z = -0.0017 \pm 0.0009$ 73.2

$[nn] = 0.00210$ $[vv] = 0.00182$ Prob. Error 1 Eq. $= \pm 0''.106$

$\pi = +0''.024 \pm 0''.019$

Groom. 884	B. D. +45°, 992	Mag. 6.5	R. A. 4^h 41.1^m	Decl. +45° 36′	Pos. Angle.
b	+45°, 995	6.6	4 41.8	45 41	51°.5

Date.		Sid. Time.	Def.	Temp.	Distance *b*.	P. M. Correction.	Corrected Sum from Groom. 864.
		h. m.		°	R	R	R
1896	Feb. 7	8 12	2	33.5	42.628	+0.017	335.667
	10	8 8	2	29	.642	.017	.681
	14	8 40	2–3	24	.657	.017	.716
1902	Mar. 25	9 47	3–4	35	42.663	−0.001	335.730
	26	10 2	2–3	34.5	.664	.001	.713
	Apr. 13	9 52	2	44.5	.657	.001	.717
	13	10 6	2	44.5	.652	.001	.717
	15	10 7	2	41.5	.663	.001	.704
	15	10 19	2	41.5	.659	.001	.704
1902	Oct. 2	0 22	3	56.5	42.648	−0.002	335.758
	6	0 53	3	51.5	.650	.002	.747
	6	1 9	3	51.5	.642	.002	.732
	8	1 11	3–4	50.5	.652	.002	.730
	9	1 12	3	42	.653	.002	.731
	10	1 17	2	42	.648	.002	.741
					Assumed Annual Proper Motion and Mean Sum:	+0.003	335.719

Observer.	Distance.	Scale Value Correction.	Corrected Distance.	Equations of Condition.				Residuals.
	R	R	R				R	R
E.	42.628	+0.007	42.652	+1.0 x	+0.66 y	−5.90 z	= −0.002	−0.011
E.	.642	+ .005	.664	1.0	0.69	5.89	+ .010	+ .001
E.	.657	+ .000	.674	1.0	0.72	5.88	+ .020	+ .010
C.	42.663	−0.001	42.661	+1.0 x	+0.87 y	+0.23 z	= +0.007	+0.001
C.	.664	+ .001	.664	1.0	0.87	0.23	+ .010	+ .004
C.	.657	+ .000	.656	1.0	0.79	0.28	+ .002	− .004
C.	.652	+ .000	.651	1.0	0.79	0.28	− .003	− .008
C.	.663	+ .002	.664	1.0	0.78	0.28	+ .010	+ .005
C.	.659	+ .002	.660	1.0	0.78	0.28	+ .006	+ .001
C.	42.648	−0.005	42.641	+1.0 x	−0.86 y	+0.75 z	= −0.013	−0.003
C.	.650	− .004	.644	1.0	0.84	0.76	− .010	+ .000
C.	.642	− .002	.638	1.0	0.84	0.76	− .016	− .006
C.	.652	− .001	.649	1.0	0.83	0.77	− .005	+ .005
C.	.653	− .002	.649	1.0	0.83	0.77	− .005	+ .005
C.	.648	− .003	.643	1.0	0.82	0.77	− .011	− .001
			Assumed Mean Distance: 42.654					

Normals:

			R	
+15.00 x	+ 1.93 y	− 11.51 z	= +0.000	
+ 1.93	+ 9.61	− 14.74	= +0.097	
− 11.51	− 14.74	+ 107.98	= −0.202	

Solution:

	R	R	
x =	−0.0018	± 0.0011	Wt. 13.8
y =	+0.0092	± 0.0015	7.6
z =	−0.0008	± 0.0005	80.3

$[nn] = 0.00150$ $[vv] = 0.00045$ Prob. Error 1 Eq. = ± 0″.052

$\pi = +0''.117 \pm 0''.019$

104 m Tauri	B. D. +18°, 779	Mag. 5.2	R. A. $4^h\ 58.9^m$	Decl. +18° 27′	Pos. Angle.
a	+18°, 777	7.9	4 56.4	18 3	236°.5
b	+18°, 783	8.2	5 0.7	18 46	53°.0

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct.	10	2 15	3	42.5	204.183	151.074	+0.078	−0.089	355.246
		11	2 14	3	48.5	.175	.085	.078	.089	.249
		12	1 38	1–2	45	.211	.069	.078	.089	.269
1893	Mar.	7	8 18	—	27.5	204.145	151.088	+0.064	−0.073	355.224
		13	8 24	2–3	36	.214	.082	.063	.072	.287
		14	8 7	2–3	21.5	.186	.055	.063	.072	.232
1896	Mar.	5	9 23	3–4	22	204.295	150.910	−0.041	+0.047	355.211
	Apr.	8	9 8	3–4	34	.296	.948	.044	.050	.250
		9	9 43	—	34	.289	.922	.044	.051	.218
1897	Aug.	28	2 27	2–3	58	204.363	150.907	−0.093	+0.106	355.283
	Sept.	3	2 15	3	50.5	.354	.900	.093	.106	.267
		6	2 30	2	68	.349	.907	.094	.107	.269
						Assumed Annual Proper Motion and Mean Sum:		+0.035	−0.040	355.251

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	53.109	+0.001	53.277	+1.0 x	+1.43 y	−2.23 z	= +0.015	+0.010
C.	.090	+ .000	.257	1.0	1.41	2.22	− .005	− .010
C.	.142	− .003	.306	1.0	1.38	2.22	+ .044	+ .039
C.	53.057	+0.004	53.198	+1.0 x	−1.71 y	−1.82 z	= −0.064	−0.066
C.	.132	− .005	.262	1.0	1.69	1.81	+ .000	− .001
C.	.131	+ .003	.269	1.0	1.68	1.80	+ .007	+ .006
C.	53.385	+0.006	53.303	+1.0 x	−1.71 y	+1.17 z	= +0.041	+0.044
C.	.348	+ .000	.254	1.0	1.41	1.26	− .008	− .005
C.	.367	+ .005	.277	1.0	1.39	1.27	+ .015	+ .018
C.	53.456	−0.005	53.252	+1.0 x	+1.72 y	+2.65 z	= −0.010	−0.007
C.	.454	− .002	.253	1.0	1.73	2.67	− .009	− .006
C.	.442	− .003	.238	1.0	1.74	2.68	− .024	− .021
	Assumed Mean Difference:		53.262					

Normals:

			R	
+12.00 x	− 0.18 y	− 0.40 z	= +0.002	
− 0.18	+30.34	+ 8.11	= +0.016	
− 0.40	+ 8.11	+50.56	= −0.074	

Solution:

	R	R	
x =	+0.0001	± 0.0062	Wt. 12.00
y =	+0.0010	± 0.0040	29.04
z =	−0.0016	± 0.0031	48.39

$[nn] = 0.00906$ $[vv] = 0.00898$ Prob. Error 1 Eq. = ± 0″.270

$\pi = +0''.013 \pm 0''.050$

λ Aurigae	B. D. +39°, 1248	Mag. 4.9	R. A. 5^h 8.9^m	Decl. +39° 59′	Pos. Angle.
a	+40°, 1215	7.6	5 4.1	40 4	276°.9
b	+40°, 1273	8.7	5 13.4	40 0	86°.8

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Sept. 21	2	24	1–2	57	265.220	239.142	+0.013	−0.010	504.365
	23	2	6	2–3	64	.198	.228	.013	.010	.429
	27	2	15	2–3	53	.239	.174	.012	.010	.415
1895	Mar. 21	9	26	3	30	265.206	239.175	−0.010	+0.008	504.379
	30	9	51	3	28.5	.232	.201	.011	.009	.431
	Apr. 10	9	53	2–3	34	.210	.165	.013	.010	.372
	11	9	23	—	35	.229	.167	.013	.010	.393
1897	Feb. 27	9	33	3–4	17	265.326	239.124	−0.101	+0.079	504.428
	28	9	18	3–4	19.5	.307	.100	.102	.080	.385
	Mar. 7	9	32	3	24	.332	.107	.102	.081	.418
1897	Sept. 3	1	36	3	51.5	265.350	239.049	−0.126	+0.099	504.372
	5	2	3	2	58.5	.332	.053	.126	.099	.358
	10	2	9	1–2	72.5	.358	.096	.126	.099	.427
	Assumed Annual Proper Motion and Mean Sum:							+0.047	−0.037	504.398

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	26.078	+0.002	26.103	$+1.0\,x$	$+1.94\,y$	$-0.28\,z$ =	+0.061	+0.046
C.	25.970	− .002	25.991	1.0	1.92	0.27	− .051	− .066
C.	26.065	− .001	26.086	1.0	1.89	0.26	+ .044	+ .029
C.	26.031	+0.001	26.014	$+1.0\,x$	$-1.90\,y$	$+0.22\,z$ =	−0.028	−0.010
C.	.031	− .002	.010	1.0	1.80	0.24	− .032	− .015
C.	.045	+ .002	.024	1.0	1.66	0.27	− .018	− .002
C.	.062	+ .000	.039	1.0	1.64	0.27	− .003	+ .013
C.	26.202	−0.002	26.020	$+1.0\,x$	$-1.93\,y$	$+2.15\,z$ =	−0.022	−0.005
C.	.207	+ .001	.026	1.0	1.93	2.16	− .016	+ .001
C.	.225	− .001	.041	1.0	1.94	2.18	− .001	+ .016
C.	26.301	+0.001	26.077	$+1.0\,x$	$+1.95\,y$	$+2.67\,z$ =	+0.035	+0.018
C.	.279	+ .002	.056	1.0	1.96	2.68	+ .014	− .003
C.	.262	− .001	.036	1.0	1.97	2.69	− .006	− .023
	Assumed Mean Difference:		26.042					

Normals:

			R		R	R	
$+13.00\,x$	$-1.17\,y$	$+14.72\,z$	$=-0.023$	*Solution:* x	$=-0.0017$	± 0.0076	Wt. 6.97
-1.17	$+46.04$	-0.08	$=+0.407$	y	$=+0.0088$	± 0.0030	45.85
$+14.72$	-0.08	$+36.06$	$=-0.003$	z	$=+0.0006$	± 0.0046	19.36

$[nn] = 0.01261$ $[vv] = 0.00895$ Prob. Error 1 Eq. $= \pm 0''.257$

$\pi = +0''.112 \pm 0''.038$

Groom. 990	B. D. +51°, 1094	Mag. 7.9	R. A. 5^h 26.9^m	Decl. +51° 21′	Pos. Angle.
a	+51°, 1074	7.5	5 19.8	51 10	261°.0
b	+51°, 1111	6.4	5 35.5	51 26	85°.7

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Sept. 25	2	15	3	42.5	320.067	385.211	−0.010	+0.010	705.278
	Oct. 1	1	40	2–3	49	.049	.207	.009	.009	.256
	6	2	4	2	41.5	.067	.218	.009	.009	.285
1895	Apr. 5	10	51	3	34.5	320.032	385.257	+0.009	−0.010	705.288
	10	11	5	2–3	33	.048	.270	.010	.010	.318
	14	10	22	3–4	41	.017	.242	.010	.010	.259
1897	Feb. 27	10	12	3–4	16.5	319.973	385.321	+0.077	−0.080	705.291
	28	10	6	3–4	18	.982	.301	.078	.080	.281
	Mar. 14	9	18	2–3	30.5	.985	.324	.079	.081	.307
1897	Sept. 4	2	19	3	55	319.936	385.339	+0.096	−0.099	705.272
	6	1	48	2	68.5	.937	.335	.096	.099	.269
	13	2	14	2	67	.944	.322	.097	.100	.263
							Assumed Annual Proper Motion and Mean Sum:	−0.036	+0.037	705.280

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	65.144	+0.000	65.164	$+1.0x$	$-1.96y$	$-0.27z$	$= -0.023$	−0.017
C.	.158	+ .002	.178	1.0	1.92	0.25	− .009	− .003
C.	.151	− .000	.169	1.0	1.88	0.24	− .018	− .012
C.	65.225	−0.001	65.205	$+1.0x$	$+1.85y$	$+0.26z$	$= +0.018$	+0.018
C.	.222	− .004	.198	1.0	1.80	0.27	+ .011	+ .011
C.	.225	+ .002	.207	1.0	1.73	0.28	+ .020	+ .020
C.	65.348	−0.001	65.190	$+1.0x$	$+1.89y$	$+2.15z$	$= +0.003$	−0.002
C.	.319	− .000	.161	1.0	1.90	2.16	− .026	− .031
C.	.339	− .002	.177	1.0	1.96	2.20	− .010	− .015
C.	65.403	+0.001	65.209	$+1.0x$	$-1.97y$	$+2.67z$	$= +0.022$	+0.021
C.	.398	+ .001	.204	1.0	1.97	2.68	+ .017	+ .016
C.	.378	+ .002	.183	1.0	1.98	2.70	− .004	− .005
	Assumed Mean Difference:		65.187					

Normals:

			R
$+12.00x$	$-0.55y$	$+14.61z$	$= +0.001$
-0.55	$+43.41$	-0.51	$= +0.052$
$+14.61$	-0.51	$+36.14$	$= +0.048$

Solution:

	R	R	
$x =$	-0.0028	± 0.0052	Wt. 6.10
$y =$	$+0.0012$	± 0.0019	43.38
$z =$	$+0.0025$	± 0.0030	18.35

$[nn] = 0.00335$ $[vv] = 0.00317$ Prob. Error 1 Eq. $= \pm 0''.161$

$\pi = +0''.015 \pm 0''.025$

Piazzi 5^h, 146	B. D. +53°, 934	Mag. 6.3	R. A. 5^h 29.6^m	Decl. +53° 24′	Pos. Angle.
a	+53°, 915	7.7	5 19.1	53 0	257°.1
b	+53°, 952	8.8	5 39.0	53 59	68°.1

Date.		Sid. Time. h.	m.	Def.	Temp. c	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Sept. 25	1	33	3	43	458.508	426.504	−0.002	+0.005	885.015
	27	1	34	2–3	53.5	.514	.395	.002	.005	884.912
	Oct. 1	2	24	2–3	48	.517	.453	.002	.005	884.973
1895	Apr. 10	10	29	2–3	33.5	458.508	426.508	+0.002	−0.005	885.013
	11	10	27	–	34	.493	.515	.002	.005	.005
	14	10	53	3	40.5	.531	.495	.002	.006	.022
1897	Mar. 4	9	43	2–3	24.5	458.494	426.541	+0.015	−0.043	885.007
	7	10	20	3	21.5	.491	.530	.015	.044	884.992
	14	10	1	2–3	32.5	.518	.551	.015	.044	885.040
1897	Sept. 4	1	36	3	55.5	458.482	426.513	+0.019	−0.053	884.961
	6	1	9	2	69	.491	.509	.019	.054	.965
	13	1	39	2	68	.492	.514	.019	.054	.971
							Assumed Annual Proper Motion and Mean Sum :	−0.007	+0.020	884.990

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	32.004	−0.001	31.996	$+1.0x$	$+1.95y$	$-0.27z$	$= -0.038$	−0.057
C.	.119	+ .003	32.115	1.0	1.94	0.26	+ .081	+ .062
C.	.064	+ .000	32.057	1.0	1.92	0.25	+ .023	+ .004
C.	32.000	−0.001	32.006	$+1.0x$	$-1.84y$	$+0.27z$	$= -0.028$	−0.008
C.	31.978	− .001	31.984	1.0	1.83	0.27	− .050	− .030
C.	32.036	− .001	32.043	1.0	1.79	0.28	+ .009	+ .028
C.	31.953	−0.001	32.010	$+1.0x$	$-1.83y$	$+2.17z$	$= -0.024$	−0.004
C.	.961	− .000	.020	1.0	1.85	2.18	− .014	+ .006
C.	.967	− .002	.024	1.0	1.89	2.20	− .010	+ .010
C.	31.969	+0.001	32.042	$+1.0x$	$+1.82y$	$+2.67z$	$= +0.008$	−0.010
C.	.982	+ .001	.056	1.0	1.84	2.68	+ .022	+ .004
C.	.978	+ .001	.052	1.0	1.90	2.70	+ .018	− .001
	Assumed Mean Difference :		32.034					

Normals :

$$+12.00x + 0.34y + 14.64z = -0.003$$
$$+0.34 + 41.84 - 0.25 = +0.432$$
$$+14.64 - 0.25 + 36.32 = -0.011$$

Solution :

	R	R	
$x =$	-0.0006	± 0.0087	Wt. 6.09
$y =$	$+0.0103$	± 0.0033	41.81
$z =$	$+0.0000$	± 0.0050	18.45

$[nn] = 0.01364$ $[vv] = 0.00917$ Prob. Error 1 Eq. $= \pm 0''.273$

$$\pi = +0''.131 \pm 0''.042$$

Lal. 10797–8	B. D. +37°, 1312	Mag. 7.1	R. A. $5^h\ 36.1^m$	Decl. +37° 14′	Pos. Angle.
a	+37°, 1282	7.8	5 30.9	37 15	271°.1
b	+37°, 1336	5.0	5 41.2	37 15	88°.8

Date.		Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Sept. 21	3 2	1–2	57.5	291.898	286.507	+0.011	−0.010	578.406
	23	2 37	2–3	63.5	.917	.498	.011	.009	.417
	Oct. 15	2 27	2	34.5	.918	.475	.009	.007	.395
1895	Mar. 21	9 58	3	30	291.937	286.486	−0.009	+0.008	578.422
	30	10 23	3	28.5	.908	.476	.010	.008	.382
	Apr. 5	10 23	3	35	.919	.473	.011	.009	.390
	11	9 54	–	34.5	.893	.484	.011	.009	.373
1897	Feb. 27	8 47	3–4	17	291.982	286.424	−0.088	+0.075	578.393
	Mar. 4	9 3	2–3	25.5	292.006	.419	.089	.076	.412
	12	9 37	3	39	.012	.407	.090	.077	.406
1897	Sept. 4	3 0	3	55	292.028	286.371	−0.109	+0.094	578.384
	5	2 39	2	58	.020	.381	.110	.094	.385
	10	2 43	1–2	74	.029	.399	.110	.094	.412
						Assumed Annual Proper Motion and Mean Sum:	+0.041	−0.035	578.399

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	5.391	−0.000	5.412	$+1.0\,x$	$+1.98\,y$	$-0.28\,z$	$=-0.015$	−0.024
C.	.419	− .000	.439	1.0	1.97	0.27	+ .012	+ .003
C.	.443	+ .000	.459	1.0	1.74	0.21	+ .032	+ .024
C.	5.451	−0.000	5.434	$+1.0\,x$	$-1.97\,y$	$+0.22\,z$	$=+0.007$	+0.018
C.	.432	+ .000	.414	1.0	1.90	0.24	− .013	− .003
C.	.446	+ .000	.426	1.0	1.84	0.26	− .001	+ .009
C.	.409	+ .000	.389	1.0	1.78	0.27	− .038	− .028
C.	5.558	+0.000	5.395	$+1.0\,x$	$-1.89\,y$	$+2.15\,z$	$=-0.032$	−0.023
C.	.587	− .000	.422	1.0	1.93	2.17	− .005	+ .004
C.	.605	− .000	.438	1.0	1.96	2.19	+ .011	+ .020
C.	5.657	+0.000	5.454	$+1.0\,x$	$+1.95\,y$	$+2.67\,z$	$=+0.027$	+0.015
C.	.639	+ .000	.435	1.0	1.96	2.68	+ .008	− .003
C.	.630	− .000	.426	1.0	1.98	2.69	− .001	− .013
	Assumed Mean Difference:		5.427					

Normals: $+13.00\,x - 1.69\,y + 14.78\,z = -0.008$ (R)
$-1.69 + 47.57 - 0.09 = +0.248$
$+14.78 - 0.09 + 36.12 = +0.017$

Solution: $x = -0.0009 \pm 0.0049$ (R) Wt. 6.93
$y = +0.0052 \pm 0.0019$ (R) 47.18
$z = +0.0008 \pm 0.0030$ (R) 19.25

$[nn] = 0.00502$ $[vv] = 0.00374$ Prob. Error 1 Eq. $= \pm 0''.165$

$\pi = +0''.065 \pm 0''.024$

Lal. 11196 *	B. D. +13°, 1036	Mag. 7.0	R. A. 5^h 47.8^m	Decl. +13° 55′	Pos. Angle.
a	+13°, 1026	8.2	5 46.5	13 48	253°.9
b	+14°, 1088	7.5	5 49.3	14 2	70°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct. 10	2 58	3	42.5	90.427	108.054	+0.045	—0.036	198.490
	11	2 53	2–3	47.5	.439	.045	.044	.035	.493
	12	2 18	1–2	45	.429	.077	.044	.035	.515
1893	Mar. 13	8 57	2–3	36	90.449	108.057	+0.036	—0.029	198.513
	14	8 45	2–3	21.5	.444	.051	.036	.029	.502
	20	9 15	3	28.5	.422	.054	.036	.029	.483
1897	Mar. 4	8 26	2–3	26	90.512	107.982	—0.043	+0.035	198.486
	7	8 55	3	23.5	.504	.998	.044	.035	.493
	12	8 58	3	39.5	.516	108.000	.044	.035	.507
1897	Aug. 28	2 58	2–3	57.5	90.527	107.983	—0.053	+0.042	198.499
	Sept. 3	3 5	3	50	.533	.977	.053	.043	.500
	5	3 25	2	57.5	.543	.963	.054	.043	.495
							+0.020	—0.016	198.499

Assumed Annual Proper Motion and Mean Sum : +0.020 —0.016 198.499

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	17.627	+0.001	17.547	$+1.0\,x$	$-1.76\,y$	$-2.23\,z$ =	—0.002	+0.005
C.	.606	+ .001	.528	1.0	1.75	2.23	— .021	— .014
C.	.648	— .002	.567	1.0	1.73	2.22	+ .018	+ .024
C.	17.608	—0.001	17.542	$+1.0\,x$	$+1.90\,y$	$-1.81\,z$ =	—0.007	—0.015
C.	.607	— .000	.542	1.0	1.90	1.80	— .007	— .015
C.	.632	+ .002	.569	1.0	1.89	1.79	+ .020	+ .012
C.	17.470	+0.001	17.549	$+1.0\,x$	$+1.87\,y$	$+2.17\,z$ =	—0.000	—0.007
C.	.494	+ .001	.574	1.0	1.88	2.18	+ .025	+ .018
C.	.484	— .001	.562	1.0	1.89	2.19	+ .013	+ .006
C.	17.456	+0.000	17.551	$+1.0\,x$	$-1.81\,y$	$+2.65\,z$ =	+0.002	+0.010
C.	.444	— .000	.540	1.0	1.87	2.67	— .009	+ .000
C.	.420	+ .000	.517	1.0	1.88	2.68	— .032	— .023

Assumed Mean Difference : 17.549

Normals :

			R	
+ 12.00 x	+ 0.53 y	+ 2.46 z	= + 0.009	
+ 0.53	+ 40.85	— 1.12	= + 0.167	
+ 2.46	— 1.12	+ 60.18	= — 0.022	

Solution :

	R	R	
x =	— 0.0001	± 0.0034	Wt. 11.89
y =	+ 0.0041	± 0.0018	40.80
z =	— 0.0003	± 0.0014	59.64

$[nn] = 0.00317$ $[vv] = 0.00250$ Prob. Error 1 Eq. = ± 0″.143

$\pi = + 0''.052 \pm 0''.022$

* Preceding component.

23 H. Camelopardi	B. D. +79°, 212	Mag. 5.5	R. A. $6^h\ 21.4^m$	Decl. +79° 42′	Pos. Angle.
a	+79°, 200	8.3	6 4.6	79 44	273°.1
b	+79°, 222	8.0	6 38.4	79 20	116°.3

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Oct. 14	2	26	3	41	213.210	242.244	−0.004	+0.001	455.451
	23	2	46	3	41	.198	.243	.003	.001	.439
	25	1	29	2	41	.193	.247	.003	.001	.438
	28	2	22	3–4	44	.188	.247	.003	.001	.433
	Nov. 4	2	31	3	42	.194	.262	.003	.001	.454
	19	2	26	3	45	.190	.253	.002	.001	.442
1903	Mar. 31	13	16	3	42	213.189	242.255	+0.004	−0.001	455.447
	Apr. 17	12	10	3–4	41	.172	.241	.005	.002	.416
	18	12	28	1–2	37.5	.165	.241	.005	.002	.409
	19	12	47	2	42	.173	.249	.005	.002	.425
	20	12	27	3	48	.195	.260	.005	.002	.458
	21	12	5	3	41	.169	.242	.005	.002	.414
1903	Sept. 12	0	8	2	59.5	213.205	242.279	+0.012	−0.004	455.492
	16	0	0	3–4	69	.169	.251	.012	.004	.428
	21	0	52	2–3	52	.174	.234	.012	.004	.416
	25	1	28	1–2	46	.179	.245	.012	004	.432
	30	0	42	3	52.5	.163	.264	.013	.004	.436
	Assumed Annual Proper Motion and Mean Sum:							−0.017	+0.006	455.437

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	29.034	−0.001	29.038	$+1.0\,x$	$-1.70\,y$	$-0.22\,z$	$= -0.023$	−0.018
C.	.045	− .000	.049	1.0	1.55	0.19	− .012	− .007
C.	.054	− .000	.058	1.0	1.52	0.18	− .003	+ .001
C.	.059	+ .000	.063	1.0	1.45	0.18	+ .002	+ .006
C.	.068	− .001	.071	1.0	1.29	0.16	+ .010	+ .014
C.	.063	− .000	.066	1.0	0.87	0.12	+ .005	+ .008
C.	29.066	−0.001	29.060	$+1.0\,x$	$+1.84\,y$	$+0.24\,z$	$= -0.001$	−0.006
C.	.069	+ .001	.063	1.0	1.61	0.29	+ .002	− .002
C.	.076	+ .002	.071	1.0	1.59	0.29	+ .010	+ .006
C.	.076	+ .001	.070	1.0	1.57	0.30	+ .009	+ .004
C.	.065	− .001	.057	1.0	1.55	0.30	− .004	− .008
C.	.073	+ .001	.067	1.0	1.52	0.30	+ .006	+ .002
C.	29.074	−0.003	29.055	$+1.0\,x$	$-1.94\,y$	$+0.70\,z$	$= -0.006$	−0.005
C.	.082	+ .001	.067	1.0	1.94	0.71	+ .006	+ .007
C.	.060	+ .001	.045	1.0	1.93	0.72	− .016	− .015
C.	.066	+ .000	.050	1.0	1.91	0.73	− .011	− .010
C.	.101	+ .000	.084	1.0	1.88	0.74	+ .023	+ .023
	Assumed Mean Difference:		29.061					

R

Normals: $+17.00\,x - 8.30\,y + 4.27\,z = -0.003$

$-8.30 + 46.22 - 2.65 = +0.085$

$+4.27 - 2.65 + 3.27 = +0.010$

Solution:	R	R	Wt.
$x =$	−0.0005	± 0.0023	10.88
$y =$	+0.0020	± 0.0012	42.02
$z =$	+0.0052	± 0.0051	2.18

$[nn] = 0.00203$ $[vv] = 0.00180$ Prob. Error 1 Eq. = ± 0″.097

$\pi = +0''.026 \pm 0''.015$

Weisse 6^h, 1500	B. D. $+1°$, 1600	Mag. 8.0	R. A. 6^h 49.1^m	Decl. $+1°$ 22′	Pos. Angle.
a	$+1°$, 1573	8.7	6 46.0	1 34	285°.1
b	$+1°$, 1622	8.3	6 52.0	1 7	109°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894 Mar. 23	9 37	2	39	224.116	222.702	+0.004	−0.020	446.802
26	9 50	3	22	.126	.723	.004	.019	.834
27	9 31	1–2	20.5	.113	.693	.004	.019	.791
1894 Oct. 15	4 3	2	34	224.126	222.696	+0.001	−0.005	446.818
17	4 29	3–4	40.5	.114	.720	.001	.005	.830
18	4 38	2	38	.131	.701	.001	.005	.828
1895 Oct. 17	4 19	3–4	34.5	224.164	222.674	−0.004	+0.020	446.854
18	5 6	2	45	.114	.674	.004	.020	.804
22	4 37	2–3	48.5	.117	.667	.004	.020	.800
1896 Apr. 16	10 5	2	67	224.126	222.663	−0.006	+0.032	446.817
22	10 27	2	44	.124	.668	.006	.032	.818
23	10 16	2–3	49.5	.124	.661	.007	.033	.811
Assumed Annual Proper Motion and Mean Sum:						+0.005	−0.025	446.817

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	1.414	+0.000	1.438	$+1.0x$	$-1.93y$	$-0.78z$	$= +0.008$	+0.006
C.	.403	− .000	.426	1.0	1.93	0.77	− .004	− .006
C.	.420	+ .000	.443	1.0	1.93	0.77	+ .013	+ .011
C.	1.430	−0.000	1.436	$+1.0x$	$+1.92y$	$-0.21z$	$= +0.006$	+0.005
C.	.394	− .000	.400	1.0	1.92	0.21	− .030	− .031
C.	.430	− .000	.436	1.0	1.91	0.21	+ .006	+ .005
C.	1.490	−0.000	1.466	$+1.0x$	$+1.92y$	$+0.79z$	$= +0.036$	+0.037
C.	.440	+ .000	.416	1.0	1.91	0.79	− .014	− .012
C.	.450	+ .000	.426	1.0	1.90	0.80	− .004	− .002
C.	1.463	+0.000	1.425	$+1.0x$	$-1.95y$	$+1.29z$	$= -0.005$	−0.001
C.	.456	− .000	.418	1.0	1.90	1.30	− .012	− .008
C.	.463	+ .000	.424	1.0	1.89	1.31	− .006	− .002
Assumed Mean Difference:			1.430					

Normals:

$$+12.00x - 0.05y + 3.33z = -0.006$$
$$-0.05x + 44.12y + 0.37z = +0.011$$
$$+3.33x + 0.37y + 8.86z = -0.025$$

Solution:

	R	R	
$x =$	$+0.0003$	± 0.0037	Wt. 10.75
$y =$	$+0.0003$	± 0.0018	44.11
$z =$	-0.0029	± 0.0043	7.94

$[nn] = 0.00293$ $[vv] = 0.00285$ Prob. Error 1 Eq. $= \pm 0''.153$

$\pi = +0''.004 \pm 0''.023$

Lal. 13427	B. D. +48°, 1469	Mag. 8.2	R. A. $6^h\ 50.5^m$	Decl. +48° 35′	Pos. Angle.
a	+49°, 1568	7.0	6 43.7	49 4	293°.7
b	+48°, 1478	8.2	6 56.8	48 0	119°.8

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct. 27	4 29	−	39	349.545	333.373	+0.113	−0.124	682.907
	Nov. 6	3 11	−	34.5	.584	.368	.112	.122	.942
	11	3 13	−	27	.593	.363	.111	.122	.945
1893	Mar. 20	10 51	3	28	349.579	333.339	+0.092	−0.101	682.909
	Apr. 4	11 11	3	55	.569	.345	.091	.100	.905
	5	10 39	3	40.5	.609	.338	.090	.099	.938
1896	Apr. 22	11 32	2	42.5	349.740	333.178	−0.068	+0.074	682.924
	23	11 26	2–3	47.5	.747	.148	.068	.075	.902
	26	11 58	3	42	.750	.168	.069	.075	.924
1897	Sept. 13	3 0	2	66	349.823	333.089	−0.140	+0.155	682.927
	15	2 39	3	53.5	.838	.109	.140	.155	.962
	17	2 47	2–3	47	.811	.065	.141	.155	.890
	Assumed Annual Proper Motion and Mean Sum:						+0.052	−0.057	682.923

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	16.172	+0.000	16.409	$+1.0\,x$	$+1.53\,y$	$-2.18\,z$	$= -0.029$	−0.031
C.	.216	− .000	.450	1.0	1.33	2.15	+ .012	+ .010
C.	.230	− .000	.463	1.0	1.22	2.14	+ .025	+ .024
C.	16.240	+0.000	16.433	$+1.0\,x$	$-1.87\,y$	$-1.78\,z$	$= -0.005$	−0.004
C.	.224	+ .000	.415	1.0	1.82	1.75	− .023	− .022
C.	.271	− .000	.460	1.0	1.81	1.74	+ .022	+ .023
C.	16.562	−0.000	16.420	$+1.0\,x$	$-1.62\,y$	$+1.30\,z$	$= -0.018$	−0.018
C.	.599	+ .000	.456	1.0	1.60	1.31	+ .018	+ .018
C.	.582	− .000	.438	1.0	1.55	1.32	+ .000	+ .000
C.	16.734	−0.000	16.439	$+1.0\,x$	$+1.87\,y$	$+2.70\,z$	$= +0.001$	−0.002
C.	.729	− .001	.433	1.0	1.88	2.70	− .005	− .008
C.	.746	+ .001	.451	1.0	1.89	2.71	+ .013	+ .010
	Assumed Mean Difference:		16.438					

R

Normals:
$+12.00\,x - 0.55\,y + 0.30\,z = +0.011$
$-0.55 + 33.87 + 9.85 = +0.031$
$+0.30 + 9.85 + 50.27 = +0.021$

R R

Solution:
$x = +0.0008 \pm 0.0038$ Wt. 11.99
$y = +0.0008 \pm 0.0023$ 31.93
$z = +0.0002 \pm 0.0018$ 47.39

$[nn] = 0.00349$ $[vv] = 0.00345$ Prob. Error 1 Eq. $= \pm 0''.167$

$\pi = +0''.011 \pm 0''.029$

Piazzi 6^h, 305	B. D. $+29°$, 1441	Mag. 6.3	R.A. 6^h 54.3^m	Decl. $+29°$ 36′	Pos. Angle.
a	$+29°$, 1430	7.5	6 52.1	29 25	$253°.2$
b	$+29°$, 1454	8.3	6 56.4	29 44	$70°.3$

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct. 23	5	6	2–3	42	146.712	134.900	—0.007	+0.026	281.631
	24	4	46	–	30.5	.724	.956	.007	.026	.699
	26	4	46	–	35	.726	.925	.007	.026	.670
1893	Mar. 20	10	8	3	28.5	146.719	34.962	—0.005	+0.021	281.697
	31	9	22	2	38.5	.696	.950	.005	.021	.662
	Apr. 4	9	46	3	58	.701	.953	.005	.021	.670
1896	Apr. 23	10	51	2–3	49	146.697	134.982	+0.004	—0.016	281.667
	26	10	54	3	43	.708	.988	.004	.016	.682
	26	11	24	3	42.5	.708	.997	.004	.016	.693
1897	Sept. 13	3	40	2	64.5	146.697	134.968	+0.008	—0.032	281.641
	15	3	13	3	51	.695	135.002	.008	.032	.673
	17	3	33	2–3	46	.704	135.003	.008	.032	.683
							Assumed Annual Proper Motion and Mean Sum :	—0.003	+0.012	281.672

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	11.812	+0.002	11.781	$+1.0\,x$	$+1.74\,y$	$-2.19\,z$	$= +0.039$	+0.024
C.	.768	— .001	.734	1.0	1.73	2.19	— .008	— .023
C.	.801	+ .000	.768	1.0	1.72	2.18	+ .026	+ .011
C.	11.757	—0.001	11.730	$+1.0\,x$	$-1.78\,y$	$-1.79\,z$	$= -0.012$	—0.001
C.	.746	+ .000	.720	1.0	1.82	1.76	— .022	— .010
C.	.748	+ .000	.722	1.0	1.83	1.75	— .020	— .008
C.	11.715	+0.000	11.735	$+1.0\,x$	$-1.74\,y$	$+1.31\,z$	$= -0.007$	+0.007
C.	.720	— .000	.740	1.0	1.71	1.33	— .002	+ .012
C.	.711	— .001	.730	1.0	1.71	1.33	— .012	+ .002
C.	11.729	+0.001	11.770	$-1.0\,x$	$+1.65\,y$	$+2.70\,z$	$= +0.028$	+0.018
C.	.693	— .000	.733	1.0	1.68	2.70	— .009	— .019
C.	.701	— .000	.741	1.0	1.70	2.71	— .001	— .011
	Assumed Mean Difference :		11.742					

Normals :

			R	
$+12.00\,x$	$-0.37\,y$	$+0.22\,z$	$= +0.000$	
-0.37	$+36.11$	$+5.02$	$= +0.262$	
$+0.22$	$+5.02$	$+50.89$	$= -0.008$	

Solution :

	R	R	
$x =$	$+0.0002$	± 0.0032	Wt. 12.00
$y =$	$+0.0074$	± 0.0018	35.60
$z =$	-0.0009	± 0.0016	50.19

$[nn] = 0.00435$ $[vv] = 0.00241$ Prob. Error 1 Eq. $= \pm 0''.140$

$\pi = +0''.094 \pm 0''.023$

Lal. 13849	B. D. +21°, 1528	Mag. 7.0	R. A. 7^h 1.5^m	Decl. +21° 29′	Pos. Angle.
a	+21°, 1481	8.4	6 54.5	21 23	266°.3
b	+21°, 1564	8.1	7 8.7	21 0	106°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Oct. 30	4 37	2–3	28.5	460.824	497.786	—0.018	+0.002	958.594
	Nov. 1	5 8	–	38.5	.841	.787	.018	.002	.612
1894	Mar. 23	10 13	2	37.5	460.803	497.799	—0.012	+0.002	958.592
	26	10 41	3	21.5	.798	.778	.012	.002	.566
	27	10 5	1–2	21	.790	.787	.012	.002	.567
1894	Oct. 15	3 29	2	34.5	460.837	497.775	—0.003	+0.000	958.609
1896	Apr. 9	10 55	–	32.5	460.780	497.802	+0.019	—0.002	958.598
	15	10 19	3	59	.757	.809	.019	.003	.582
	16	10 32	2	66	.815	.791	.019	.003	.622
1897	Oct. 9	3 14	3–4	39	460.758	497.769	+0.041	—0.004	958.564
	13	3 23	2–3	47	.768	.814	.042	.004	.620
	14	4 15	2–3	53.5	.748	.770	.042	.004	.556
						Assumed Annual Proper Motion and Mean Sum:	—0.015	+0.002	958.589

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	36.962	—0.000	36.982	+1.0 x	—1.78 y	—1.17 z =	—0.007	+0.014
C.	36.946	— .001	36.965	1.0	1.76	1.17	— .024	— .004
C.	36.996	—0.000	37.010	+1.0 x	+1.92 y	—0.78 z =	+ .021	+0.012
C.	36.980	+ .001	36.995	1.0	1.94	0.77	+ .006	— .003
C.	36.997	+ .001	37.012	1.0	1.94	0.77	+ .023	+ .014
C.	36.938	—0.001	36.940	+1.0 x	—1.92 y	—0.21 z =	—0.049	—0.029
C.	37.022	—0.000	37.000	+1.0 x	+1.94 y	+1.27 z =	+0.011	—0.002
C.	37.052	+ .000	37.030	1.0	1.92	1.28	+ .041	+ .028
C.	36.976	— .001	36.953	1.0	1.91	1.29	— .036	— .049
C.	37.011	+0.001	36.967	+1.0 x	—1.95 y	+2.77 z =	—0.022	—0.008
C.	37.046	— .001	36.999	1.0	1.93	2.78	+ .010	+ .024
C.	37.022	+ .001	36.977	1.0	1.93	2.78	— .012	+ .002
			Assumed Mean Difference:	36.989				

Normals:

			R	
+ 12.00 x	+ 0.30 y	+ 7.30 z	= —0.037	
+ 0.30	+ 43.51	— 8.70	= + 0.323	
+ 7.30	— 8.70	+ 32.61	= —0.039	

Solution:

	R	R	
x =	—0.0044	± 0.0051	Wt. 10.24
y =	+ 0.0078	± 0.0026	40.70
z =	+ 0.0019	± 0.0032	26.35

$[nn] = 0.00785$ $[vv] = 0.00524$ Prob. Error 1 Eq. = ± 0″.206

$\pi = + 0''.099 \pm 0''.032$.

28 H. Camelopardi	B. D. +80°, 238	Mag. 6.5	R. A. $7^h\ 32.1^m$	Decl. +80° 37′	Pos. Angle.
a	+81°, 252	7.0	7 8.0	81 11	302°.3
b	+79°, 269	7.8	7 54.0	79 55	128°.5

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Oct. 20	2	15	3–4	45.5	311.581	329.221	—0.008	+0.005	640.799
	23	3	23	3	39	.613	.232	.008	.005	.842
	25	2	10	2	40	.588	.233	.008	.005	.818
	28	3	6	3–4	42	.597	.244	.008	.005	.838
	31	2	31	3–4	39	.596	.202	.007	.005	.796
	Nov. 20	2	38	3–4	42.5	.586	.255	.005	.003	.839
1903	Mar. 31	14	9	3	41	311.569	329.244	+0.010	—0.006	640.817
	Apr. 17	13	0	3–4	44	.543	.225	.012	.008	.772
	18	13	6	1–2	36.5	.565	.231	.012	.008	.800
	19	13	25	2	40.5	.569	.232	.013	.008	.806
	20	13	4	3	47	.566	.236	.013	.008	.807
	21	12	44	3	40	.553	.217	.013	.008	.775
1903	Sept. 13	1	10	3–4	66	311.549	329.236	+0.029	—0.019	640.795
	21	1	34	3–4	53	.554	.255	.030	.019	.820
	25	2	8	1–2	45.5	.553	.242	.031	.020	.806
	30	1	23	3	52	.547	.300	.031	.020	.858
	Assumed Annual Proper Motion and Mean Sum:							—0.042	+0.027	640.812

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	17.640	+0.000	17.653	$+1.0\,x$	$-1.61\,y$	$-0.20\,z$	$= +0.001$	+0.005
C.	.619	— .001	.631	1.0	1.55	0.19	— .021	— .017
C.	.645	— .000	.658	1.0	1.51	0.19	+ .006	+ .010
C.	.647	— .001	.659	1.0	1.44	0.18	+ .007	+ .011
C.	.606	+ .000	.618	1.0	1.37	0.17	— .034	— .030
C.	.669	— .001	.676	1.0	0.81	0.12	+ .024	+ .027
C.	17.675	—0.000	17.659	$+1.0\,x$	$+1.84\,y$	$+0.24\,z$	$= +0.007$	+0.008
C.	.682	+ .001	.663	1.0	1.64	0.29	+ .011	+ .011
C.	.666	+ .000	.646	1.0	1.62	0.29	— .006	— .005
C.	.663	+ .000	.642	1.0	1.61	0.30	— .010	— .010
C.	.670	+ .000	.649	1.0	1.60	0.30	— .003	— .003
C.	.664	+ .001	.644	1.0	1.58	0.30	— .008	— .008
C.	17.687	+0.000	17.639	$+1.0\,x$	$-1.95\,y$	$+0.70\,z$	$= -0.013$	—0.018
C.	.701	— .000	.652	1.0	1.94	0.72	+ .000	— .005
C.	.689	+ .000	.638	1.0	1.93	0.73	— .014	— .019
C.	.753	— .001	.701	1.0	1.91	0.74	+ .049	+ .044
	Assumed Mean Difference:		17.652					

Normals:

			R	
$+16.00\,x$	$-6.13\,y$	$+3.56\,z$	$= -0.004$	
-6.13	$+43.16$	-1.27	$= -0.015$	
$+3.56$	-1.27	$+2.77$	$= +0.018$	

Solution:

	R	R	
$x =$	−0.0026	± 0.0040	Wt. 10.96
$y =$	−0.0004	± 0.0021	40.80
$z =$	+0.0098	± 0.0095	1.98

$[nn] = 0.00540$ $[vv] = 0.00522$ Prob. Error 1 Eq. $= \pm 0''.170$

$\pi = -0''.005 \pm 0''.027$

Lal. 15290	B. D. +31°, 1684	Mag. 8.2	R. A. $7^h\ 44.3^m$	Decl. +31° 3′	Pos. Angle.
a	+31°, 1668	8.5	7 39.6	31 16	283°.4
b	+30°, 1626	8.3	7 50.2	30 50	98°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct. 28	4 53	2–3	38.5	296.081	363.477	+0.186	−0.174	659.570
	29	4 32	2	41	.064	.476	.185	.174	.551
	Nov. 6	3 54	–	34.5	.123	.496	.183	.172	.630
1893	Apr. 4	10 23	3	57	296.114	363.472	+0.149	−0.140	659.595
	6	10 35	3	30.5	.112	.472	.148	.139	.593
	11	11 33	3	35	.125	.482	.147	.138	.616
1897	Mar. 28	11 49	3	33.5	296.467	363.145	−0.190	+0.179	659.601
	29	11 31	2	35.5	.466	.159	.190	.179	.614
	Apr. 12	11 8	1–2	39	.461	.152	.194	.182	.601
1897	Sept. 15	3 52	3	50	296.506	363.095	−0.230	+0.216	659.587
	17	4 6	2–3	45	.488	.107	.230	.216	.581
	18	3 6	3	53	.497	.090	.230	.216	.573
						Assumed Annual Proper Motion and Mean Sum:	+0.085	−0.080	659.592

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	67.396	+0.002	67.038	$+1.0\,x$	$-1.91\,y$	$-2.18\,z$	$= -0.015$	−0.003
C.	.412	+ .004	.057	1.0	1.90	2.17	+ .004	+ .016
C.	.373	− .004	.014	1.0	1.81	2.15	− .039	− .028
C.	67.358	−0.000	67.069	$+1.0\,x$	$+1.95\,y$	$-1.75\,z$	$= +0.016$	+0.005
C.	.360	− .000	.073	1.0	1.96	1.74	+ .020	+ .009
C.	.357	− .002	.070	1.0	1.98	1.73	+ .017	+ .006
C.	66.678	−0.001	67.046	$+1.0\,x$	$+1.91\,y$	$+2.24\,z$	$= -0.007$	−0.018
C.	.693	− .002	.060	1.0	1.91	2.24	+ .007	− .004
C.	.691	− .001	.066	1.0	1.98	2.28	+ .013	+ .002
C.	66.589	+0.000	67.035	$+1.0\,x$	$-1.74\,y$	$+2.70\,z$	$= -0.018$	−0.007
C.	.619	+ .001	.066	1.0	1.78	2.71	+ .013	+ .024
C.	.593	+ .002	.041	1.0	1.79	2.71	− .012	− .001
	Assumed Mean Difference:		67.053					

Normals:

$$\begin{aligned} +12.00\,x + 0.76\,y + 3.16\,z &= -0.001 \\ +0.76\,x + 42.72\,y + 0.62\,z &= +0.251 \\ +3.16\,x + 0.62\,y + 60.37\,z &= +0.003 \end{aligned}$$

Solution:

$$\begin{aligned} x &= -0.0005 \pm 0.0030 \quad \text{Wt. } 11.83 \\ y &= +0.0059 \pm 0.0016 \quad 42.67 \\ z &= -0.0000 \pm 0.0013 \quad 59.54 \end{aligned}$$

$[nn] = 0.00361$ $\quad [vv] = 0.00213$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.132$

$$\pi = +0''.075 \pm 0''.020$$

Lal. 15547	B. D. +21°, 1731	Mag. 8.5	R. A. 7^h 51.0^m	Decl. +21° 16′	Pos. Angle.
a	+21°, 1714	7.2	7 45.7	21 29	280°.6
b	+21°, 1753	7.0	7 55.9	21 26	82°.1

Date.		Sid. Time. h. m.	Def.	Temp. c	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Nov. 18	4 45	3–4	37	359.385	329.332	+0.049	−0.034	688.732
	19	4 39	2–3	28.5	.383	.292	.049	.034	.690
	Dec. 15	6 18	2	26.5	.358	.297	.047	.033	.669
	22	5 11	3	12	.350	.308	.047	.033	.672
	23	5 6	3	8	.359	.282	.047	.032	.656
1893	Apr. 1	11 50	3–4	51	359.377	329.292	+0.040	−0.028	688.681
	9	10 58	3	42	.357	.331	.040	.028	.700
	18	11 25	3–4	41.5	.384	.313	.039	.027	.709
1897	Mar. 28	10 40	3	34	359.455	329.245	−0.052	+0.036	688.684
	Apr. 12	10 33	1–2	39.5	.470	.257	.052	.036	.711
	22	11 1	1–2	43.5	.463	.244	.053	.037	.691
1897	Sept. 18	4 30	3	51	359.461	329.233	−0.062	+0.043	688.675
	Oct. 13	4 35	2–3	45	.497	.230	.064	.045	.708
	15	5 17	2–3	65.5	.479	.207	.064	.045	.667
	Assumed Annual Proper Motion and Mean Sum:						+0.023	−0.016	688.690

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	30.053	−0.002	30.134	$+1.0\,x$	$+1.64\,y$	$-2.12\,z$ =	−0.003	−0.016
C.	.091	+ .000	.174	1.0	1.62	2.12	+ .037	+ .024
C.	.061	+ .001	.142	1.0	1.00	2.05	+ .005	− .004
C.	.042	+ .001	.123	1.0	0.78	2.03	− .014	− .021
C.	.077	+ .001	.157	1.0	0.75	2.03	+ .020	+ .013
C.	30.085	+0.000	30.153	$+1.0\,x$	$-1.88\,y$	$-1.75\,z$ =	+0.016	+0.026
C.	.026	− .000	.094	1.0	1.93	1.73	− .043	− .033
C.	.071	− .001	.136	1.0	1.95	1.71	− .001	+ .010
C.	30.210	+0.000	30.122	$+1.0\,x$	$-1.84\,y$	$+2.24\,z$ =	−0.015	−0.003
C.	.213	− .001	.124	1.0	1.94	2.28	− .013	− .000
C.	.219	− .000	.129	1.0	1.95	2.30	− .008	+ .005
C.	30.228	+0.001	30.124	$+1.0\,x$	$+1.70\,y$	$+2.71\,z$ =	−0.013	−0.024
C.	.267	− .001	.157	1.0	1.90	2.78	+ .020	+ .008
C.	.272	+ .001	.164	1.0	1.91	2.79	+ .027	+ .015
	Assumed Mean Difference:		30.137					

Normals:

			R	
$+14.00\,x$	$-0.19\,y$	$-0.44\,z$	$= +0.015$	Wt. 14.00
-0.19	$+39.63$	$+0.10$	$= +0.256$	39.63
-0.44	$+0.10$	$+68.75$	$= -0.033$	68.74

Solution: R R

$x = +0.0011 \pm 0.0035$

$y = +0.0065 \pm 0.0021$

$z = -0.0005 \pm 0.0016$

$[nn] = 0.00586$ $[vv] = 0.00420$ Prob. Error 1 Eq. $= \pm 0''.167$

$\pi = +0''.082 \pm 0''.027$

Lal. 15565	B. D. +29°, 1664	Mag. 7.5	R. A. $7^h\ 51.5^m$	Decl. +29° 39′	Pos. Angle.
a	+30°, 1612	7.0	7 47.2	30 14	302°.3
b	+29°, 1688	8.4	7 58.3	29 0	113°.4

Date.	Sid. Time.	Def.	Temp.	Distance *a*.	Distance *b*.	P. M. Corrections.		Corrected Sum.
	h. m.		°	R	R	R	R	R
1892 Oct. 28	4 14	2–3	38.5	316.149	455.420	+0.076	−0.057	771.588
29	5 5	2	41	.133	.378	.076	.057	.530
Nov. 11	3 47	–	27	.165	.427	.075	.056	.611
1893 Apr. 1	12 27	3–4	49	316.172	455.410	+0.061	−0.045	771.598
6	11 28	3	30	.171	.376	.061	.045	.563
18	12 4	3–4	40.5	.167	.405	.060	.044	.588
1897 Mar. 28	11 16	3	34	316.303	455.313	−0.078	+0.058	771.596
29	10 58	2	35.5	.317	.318	.078	.058	.615
Apr. 22	11 31	1–2	43.5	.311	.307	.080	.060	.598
1897 Sept. 18	3 45	3	52	316.314	455.256	−0.095	+0.070	771.545
Oct. 15	3 54	2–3	63.5	.321	.281	.098	.073	.577
26	4 55	3–4	43.5	.333	.244	.099	.073	.551
Assumed Annual Proper Motion and Mean Sum:						+0.035	−0.026	771.580

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	139.271	−0.001	139.137	$+1.0\,x$	$-1.85\,y$	$-2.18\,z$	= +0.013	+0.016
C.	.245	+ .009	.121	1.0	1.84	2.18	− .003	− .000
C.	.262	· .006	.125	1.0	1.67	2.14	+ .001	+ .003
C.	139.238	−0.003	139.129	$+1.0\,x$	$+1.88\,y$	$-1.75\,z$	= +0.005	−0.001
C.	.205	+ .003	.102	1.0	1.89	1.74	− .022	− .028
C.	.238	.001	.133	1.0	1.93	1.71	+ .009	+ .003
C.	139.010	−0.003	139.143	$+1.0\,x$	$+1.86\,y$	$+2.24\,z$	= +0.019	+0.016
C.	.001	− .006	.131	1.0	1.87	2.24	+ .007	+ .004
C.	138.996	− .003	.133	1.0	1.90	2.30	+ .009	+ .006
C.	138.942	+0.006	139.113	$+1.0\,x$	$-1.72\,y$	$+2.71\,z$	= −0.011	−0.005
C.	.960	+ .001	.132	1.0	1.89	2.79	+ .008	+ .015
C.	.911	+ .005	.088	1.0	1.87	2.82	− .036	− .029
Assumed Mean Difference:			139.124					

Normals:

$$+12.00\,x + 0.49\,y + 3.40\,z = -0.001$$
$$+0.49\,x + 41.02\,y - 0.74\,z = +0.100$$
$$+3.40\,x - 0.74\,y + 61.49\,z = -0.048$$

Solution:

	R	R	
x =	+0.0000	±0.0033	Wt. 11.80
y =	+0.0024	±0.0017	40.99
z =	−0.0008	±0.0014	60.51

$[nn] = 0.00274$ $[vv] = 0.00249$ Prob. Error 1 Eq. = ±0″.143

$\pi = +0''.031 \pm 0''.022$

Piazzi 7h, 321	B. D. +32°, 1695	Mag. 6.7	R. A. 8h 2.6m	Decl. +32° 55′	Pos. Angle.
a	+32°, 1683	8.2	7 57.9	32 51	265°.8
b	+32°, 1704	7.5	8 6.7	32 38	108°.4

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Oct. 28	6 18	–	39	278.946	260.919	—0.051	+0.015	539.829
	30	5 14	2–3	28.5	.958	.911	.050	.015	.834
	Nov. 1	5 43	–	38.5	.941	.911	.050	.015	.817
1894	Apr. 2	10 20	–	28	278.940	260.954	—0.032	+0.010	539.872
	17	10 56	2	43	.931	.917	.030	.009	.827
	May 10	12 39	2–3	47.5	.935	.957	.028	.008	.872
1896	Apr. 15	10 58	3	57.5	278.856	260.971	+0.055	—0.017	539.865
	16	11 25	2	63.5	.850	.961	.055	.017	.849
	22	10 58	2	44	.841	.966	.056	.017	.846
1897	Oct. 9	3 53	3–4	38	278.785	260.972	+0.119	—0.036	539.840
	13	3 55	2–3	46	.778	.972	.120	.036	.834
	26	4 20	3–4	43	.770	.970	.121	.037	.824
					Assumed Annual Proper Motion and Mean Sum:		—0.043	+0.013	539.842

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	18.027	+0.000	17.961	$+1.0\,x$	$+1.92\,y$	$-1.18\,z$ =	+0.001	—0.007
C.	.047	+ .000	.982	1.0	1.91	1.17	+ .022	+ .013
C.	.030	+ .001	.966	1.0	1.89	1.17	+ .006	— .002
C.	17.986	—0.001	17.943	$+1.0\,x$	$-1.87\,y$	$-0.75\,z$ =	—0.017	—0.013
C.	18.014	+ .001	.976	1.0	1.97	0.71	+ .016	+ .021
C.	17.978	— .001	.941	1.0	1.81	0.65	— .019	— .015
C.	17.885	—0.001	17.956	$+1.0\,x$	$-1.96\,y$	$+1.28\,z$ =	—0.004	+0.003
C.	.889	— .000	.961	1.0	1.96	1.28	+ .001	+ .008
C.	.875	— .000	.948	1.0	1.97	1.30	— .012	— .005
C.	17.813	+0.000	17.968	$+1.0\,x$	$+1.91\,y$	$+2.77\,z$ =	+0.008	+0.004
C.	.806	+ .000	.962	1.0	1.93	2.78	+ .002	— .002
C.	.800	+ .001	.959	1.0	1.94	2.82	— .001	— .005
	Assumed Mean Difference:		17.960					

Normals:

			R	
$+12.00\,x$	$-0.04\,y$	$+6.60\,z$	= +0.003	
-0.04	$+44.26$	$+5.82$	= +0.136	
$+6.60$	$+5.82$	$+29.53$	= —0.015	

Solution:

	R	R	
x =	+0.0009	± 0.0022	Wt. 10.69
y =	+0.0032	± 0.0011	43.14
z =	—0.0012	± 0.0013	29.53

$[nn] = 0.00165$ $[vv] = 0.00119$ Prob. Error·1 Eq. = ± 0″.099

$\pi = +0''.040 \pm 0''.015$

Weisse 8^h, 181–2	B. D. +31°, 1781	Mag. 8.3	R. A. 8^h 9.2^m	Decl. +31° 5′	Pos. Angle.
a	+31°, 1756	8.0	8 3.2	31 16	279°.3
b	+30°, 1702	8.1	8 14.5	30 38	110°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Nov. 19	5 23	2–3	29	370.201	345.925	—0.038	—0.023	716.065
	20	3 53	3	33	.152	.971	.038	.023	.062
	Dec. 20	5 8	3	16	.193	.953	.037	.022	.087
1893	Apr. 9	11 32	3	41.5	370.147	345.920	—0.031	—0.019	716.017
	11	12 22	3	34.5	.174	.928	.031	.019	.051
	18	12 42	3–4	39.5	.189	.924	.031	.019	.063
1897	Mar. 29	12 6	2	36	370.110	345.885	+0.040	+0.025	716.060
	Apr. 12	11 43	1–2	38.5	.105	.900	.041	.025	.071
	22	12 13	1–2	42.5	.104	.907	.041	.025	.077
1897	Oct. 9	4 30	3–4	36.5	370.073	345.858	+0.050	+0.030	716.011
	15	4 30	2–3	64.5	.095	.883	.050	.031	.059
	26	5 42	3–4	44	.080	.902	.051	.031	.064
		Assumed Annual Proper Motion and Mean Sum :					—0.018	—0.011	716.057

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	24.276	—0.000	24.261	+1.0 x	+1.67 y	−2.12 z =	+0.037	+0.041
C.	.181	— .000	.166	1.0	1.65	2.12	— .058	— .054
C.	.240	— .001	.224	1.0	0.93	2.03	+ .000	+ .002
C.	24.227	+0.001	24.216	+1.0 x	−1.95 y	−1.73 z =	—0.008	—0.014
C.	.246	+ .000	.234	1.0	1.96	1.73	+ .010	+ .004
C.	.265	— .000	.253	1.0	1.98	1.71	+ .029	+ .023
C.	24.225	—0.000	24.240	+1.0 x	−1.86 y	+2.24 z =	+0.016	+0.012
C.	.205	— .000	.221	1.0	1.96	2.28	— .003	+ .008
C.	.197	— .001	.212	1.0	1.97	2.30	— .012	— .017
C.	24.215	+0.002	24.237	+1.0 x	+1.93 y	+2.77 z =	+0.013	+0.018
C.	.212	— .000	.231	1.0	1.96	2.79	+ .007	+ .013
C.	.178	— .000	.198	1.0	1.96	2.82	— .026	— .020
	Assumed Mean Difference :		24.224					

Normals :

			R	
+ 12.00 x	− 1.58 y	+ 3.76 z	= + 0.005	
− 1.58	+ 40.59	+ 4.40	= − 0.107	
+ 3.76	+ 4.40	+ 60.91	= − 0.024	

Solution :

	R	R	
x =	+ 0.0001	± 0.0054	Wt. 11.69
y =	− 0.0026	± 0.0029	39.99
z =	− 0.0002	± 0.0024	59.14

$[nn] = 0.00704$ $[vv] = 0.00675$ Prob. Error 1 Eq. = ± 0″.234

$\pi = -0''.033 \pm 0''.037$

Lal. 16904	B. D. +56°, 1322	Mag. 8.1	R. A. 8^h 29.6^m	Decl. +56° 12′	Pos. Angle.
a	+55°, 1284	7.5	8 21.9	55 50	252°.8
b	+56°, 1336	8.2	8 38.0	56 52	60°.1

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1895	Nov. 29	3	7	3	36	321.204	378.464	−0.141	+0.228	699.755
	30	3	15	3	30	.219	.451	.141	.228	.757
	Dec. 3	4	38	3	20	.205	.420	.141	.227	.711
1902	May 9	13	2	–	44	321.077	378.696	+0.008	−0.013	699.768
	11	14	7	4	44	.065	.703	.008	.013	.763
	17	14	30	–	61	.083	.684	.009	.014	.762
	21	14	19	2	51	.073	.695	.009	.015	.762
	24	13	21	4	67	.085	.700	.009	.015	.779
1902	Dec. 6	3	48	2	13	321.052	378.713	+0.022	−0.035	699.752
	8	2	55	3	10	.049	.735	.022	.035	.771
	18	3	30	3	32	.042	.714	.022	.036	.742
	27	3	19	3	17	.044	.713	.023	.037	.743
	28	2	54	2	22	.054	.697	.023	.037	.737
	28	4	39	2	22	.042	.711	.023	.037	.739
	30	2	59	2	30	.030	.702	.023	.037	.718
	30	4	24		29	.047	.697	.023	.037	.730
								−0.023	+0.037	699.749

Assumed Annual Proper Motion and Mean Sum: −0.023 +0.037 699.749

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	57.260	−0.000	57.629	$+1.0\,x$	$-1.43\,y$	$-6.09\,z$ =	+0.029	+0.023
E.	.232	− .001	.600	1.0	1.41	6.09	+ .000	− .005
E.	.215	+ .003	.586	1.0	1.36	6.08	− .014	− .019
S.	57.619	−0.002	57.596	$+1.0\,x$	$+1.70\,y$	$+0.35\,z$ =	−0.004	+0.001
S.	.638	− .001	.616	1.0	1.70	0.36	+ .016	+ .021
S.	.601	− .001	.577	1.0	1.69	0.37	− .023	− .017
S.	.622	− .001	.597	1.0	1.68	0.39	− .003	+ .002
S.	.615	− .002	.589	1.0	1.67	0.39	− .011	− .006
S.	57.661	−0.000	57.604	$+1.0\,x$	$-1.53\,y$	$+0.93\,z$ =	+0.004	−0.004
S.	.686	− .002	.627	1.0	1.50	0.93	+ .027	+ .019
S.	.672	+ .001	.615	1.0	1.34	0.96	+ .015	+ .008
S.	.669	+ .000	.609	1.0	1.19	0.99	+ .009	+ .002
S.	.643	+ .001	.584	1.0	1.16	0.99	− .016	− .023
S.	.669	+ .001	.610	1.0	1.16	0.99	+ .010	+ .003
S.	.672	+ .003	.615	1.0	1.12	1.00	+ .015	+ .008
S.	.650	+ .002	.592	1.0	1.12	1.00	− .008	− .014

Assumed Mean Difference: 57.600

Normals:

$$+16.00\,x - 5.88\,y - 8.61\,z = +0.046$$
$$-5.88\,x + 33.12\,y + 18.87\,z = -0.142$$
$$-8.61\,x + 18.87\,y + 119.42\,z = -0.054$$

Solution:

	R	R	
$x =$	+0.0015	± 0.0027	Wt. 14.7
$y =$	−0.0042	± 0.0019	28.8
$z =$	+0.0003	± 0.0010	106.8

$[nn] = 0.00367$ $[vv] = 0.00302$ Prob. Error 1 Eq. = ± 0″.129

$$\pi = -0''.053 \pm 0''.024$$

Lal. 17161	B. D. +42°, 1922	Mag. 8.2	R. A. $8^h\ 35.6^m$	Decl. +42° 13′	Pos. Angle.
a	+42°, 1903	8.6	8 27.9	42 18	274°.0
b	+42°, 1940	8.3	8 43.9	42 31	78°.5

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Oct. 18	5	22	1	38	401.294	442.663	−0.004	+0.007	843.960
	Nov. 18	4	59	2	17	.315	.703	.002	.004	844.020
	Dec. 3	5	20	1–2	21	.301	.655	.001	.003	843.958
1895	May 9	12	48	2–3	67	401.316	442.745	+0.006	−0.012	844.055
	15	13	33	3	45.5	.392	.735	.007	.013	.121
	16	12	57	2–3	48	.324	.699	.007	.013	.017
1897	Apr. 19	12	47	3	31	401.308	442.793	+0.041	−0.080	844.062
	28	13	0	3	41.5	.321	.775	.042	.081	.057
	29	13	17	3–4	54	.273	.785	.042	.081	.019
1897	Nov. 3	5	10	3–4	38.5	401.259	442.799	+0.051	−0.099	844.010
	17	5	20	2	25.5	.239	.796	.052	.101	843.986
	Dec. 23	5	46	–	18	.269	.772	.054	.104	.991
	Assumed Annual Proper Motion and Mean Sum:							−0.018	+0.035	844.021

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	41.369	+0.003	41.383	$+1.0\,x$	$-1.82\,y$	$-0.21\,z$	$= +0.014$	+0.001
C.	.388	+ .000	.394	1.0	1.74	0.12	+ .025	+ .013
C.	.354	+ .003	.361	1.0	1.56	0.08	− .008	− .019
C.	41.429	−0.002	41.409	$+1.0\,x$	$+1.86\,y$	$+0.35\,z$	$= +0.040$	+0.050
C.	.343	− .005	.318	1.0	1.82	0.37	− .051	− .041
C.	.375	+ .000	.355	1.0	1.81	0.37	− .014	− .004
C.	41.485	−0.002	41.362	$+1.0\,x$	$+1.86\,y$	$+2.30\,z$	$= -0.007$	+0.002
C.	.454	− .002	.329	1.0	1.90	2.32	− .040	− .030
C.	.512	+ .000	.389	1.0	1.90	2.32	+ .020	+ .030
C.	41.540	+0.001	41.391	$+1.0\,x$	$-1.84\,y$	$+2.84\,z$	$= +0.022$	+0.008
C.	.557	+ .002	.406	1.0	1.75	2.88	+ .037	+ .023
C.	.503	+ .002	.347	1.0	1.11	2.97	− .022	− .032
	Assumed Mean Difference:		41.369					

Normals:

$$+12.00\,x + 1.33\,y + 16.31\,z = +0.016$$
$$+1.33\,x + 37.18\,y + 2.21\,z = -0.232$$
$$+16.31\,x + 2.21\,y + 41.69\,z = +0.027$$

Solution:

$$x = +0.0014 \pm 0.0085 \quad \text{Wt. } 5.61$$
$$y = -0.0063 \pm 0.0033 \quad 37.01$$
$$z = +0.0004 \pm 0.0046 \quad 19.49$$

$[nn] = 0.00967$ $[vv] = 0.00816$ Prob. Error 1 Eq. $= \pm 0.''257$

$$\pi = -0.''080 \pm 0.''042$$

55 ρ Cancri	B. D. +28°, 1660	Mag. 6.0	R. A. $8^h\ 44.0^m$	Decl. +28° 53′	Pos. Angle.
a	+28°, 1647	7.0	8 38.4	28 41	261°.3
b	+28°, 1666	5.5	8 47.0	28 29	121°.2

Date.	Sid. Time. h. m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894 Oct. 17	5 17	3-4	41°	349.503	220.828	−0.006	+0.005	570.330
18	5 57	1	38	.511	.842	.006	.005	.352
Nov. 6	5 30	2-3	26.5	.472	.832	.005	.004	.303
1895 May 5	11 57	3	60.5	349.498	220.866	+0.010	−0.008	570.366
9	12 8	2-3	68.5	.487	.878	.010	.009	.366
15	13 0	3	46	.501	.870	.011	.009	.373
1897 Apr. 19	12 8	3	32	349.441	220.936	+0.069	−0.058	570.388
28	12 19	3	42.5	.433	.901	.070	.058	.346
29	12 42	3-4	55	.436	.927	.070	.058	.375
1897 Nov. 3	5 50	3-4	39	349.404	220.912	+0.085	−0.071	570.330
17	6 10	2	25.5	.407	.910	.086	.072	.331
Dec. 1	5 46	1-2	32.5	.389	.908	.087	.073	.311
Assumed Annual Proper Motion and Mean Sum:						−0.030	+0.025	570.347

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
C.	128.675	+0.004	128.668	+1.0 x	+1.81 y	−0.21 z	=	+0.022	+0.013
C.	.669	− .001	.657	1.0	1.81	0.21	=	+ .011	+ .002
C.	.640	+ .010	.641	1.0	1.82	0.15	=	− .005	− .014
C.	128.632	−0.004	128.646	+1.0 x	−1.86 y	+0.34 z	=	+0.000	+0.007
C.	.609	− .004	.624	1.0	1.83	0.35	=	− .022	− .015
C.	.631	− .006	.645	1.0	1.78	0.37	=	− .001	+ .006
C.	128.505	−0.009	128.623	+1.0 x	−1.89 y	+2.30 z	=	−0.023	−0.015
C.	.532	+ .000	.660	1.0	1.88	2.32	=	+ .014	+ .022
C.	.509	− .006	.631	1.0	1.88	2.32	=	− .015	− .007
C.	128.492	+0.004	128.652	+1.0 x	+1.84 y	+2.84 z	=	+0.006	−0.002
C.	.497	+ .004	.659	1.0	1.73	2.88	=	+ .013	+ .006
C.	.481	+ .008	.649	1.0	1.58	2.91	=	+ .003	− .004

Assumed Mean Difference: 128.646

Normals:

			R	
+ 12.00 x	− 0.53 y	+ 16.06 z	= +0.003	
− 0.53	+ 39.36	− 1.21	= +0.176	
+ 16.06	− 1.21	+ 41.36	= −0.007	

Solution:

	R	R	
x	= +0.0011	±0.0036	Wt. 5.74
y	= +0.0045	±0.0014	39.32
z	= −0.0005	±0.0020	19.79

$[nn] = 0.00228$ $[vv] = 0.00148$ Prob. Error 1 Eq. $= \pm 0''.110$

$$\pi = +0''.057 \pm 0''.017$$

ι Ursae maj.	B. D. +48°, 1707	Mag. 3.1	R. A. 8^h 49.3^m	Decl. +48° 36′	Pos. Angle.
a	+48°, 1693	8.0	8 42.0	48 7	247°.8
b	+49°, 1801	6.5	8 55.4	49 6	64°.0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1895	Nov. 29	3 27	3	36	369.154	319.815	−0.196	+0.240	689.013
	30	3 34	3	30	.104	.817	.196	.240	688.965
	Dec. 3	5 0	2	20	.079	.823	.196	.240	.946
1902	May 9	13 30	–	44	368.917	320.063	+0.011	−0.013	688.978
	11	13 38	4	44	.902	.053	.012	.013	.954
	13	13 6	3	57	.907	.073	.012	.013	.979
	17	13 25	–	61	.936	.088	.012	.014	689.022
	21	13 20	2	53	.901	.082	.013	.014	688.982
1902	Dec. 18	3 59	3	32	368.889	320.072	+0.031	−0.036	688.956
	27	3 50	3	16	.882	.086	.032	.037	.963
	28	3 30	2	22	.858	.076	.032	.037	.929
	28	5 14	2	21	.901	.093	.032	.037	.989
	30	3 33	2	29	.887	.083	.032	.037	.965
	30	4 52	2	28	.894	.087	.032	.037	.976
	31	2 50	2	26	.877	.062	.032	.037	.934
	31	3 10	2	25	.883	.085	.032	.037	.963
		Assumed Annual Proper Motion and Mean Sum:					−0.032	+0.037	688.969

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	49.339	−0.003	48.900	+1.0 *x*	+1.56 *y*	−6.09 *z*	= +0.030	+0.042
E.	.287	+ .000	.851	1.0	1.55	6.09	− .019	− .007
E.	.256	+ .002	.822	1.0	1.53	6.08	− .048	− .036
S.	48.854	−0.001	48.877	+1.0 *x*	−1.63 *y*	+0.35 *z*	= +0.007	+0.013
S.	.849	+ .001	.875	1.0	1.63	0.36	+ .005	+ .011
S.	.834	− .001	.858	1.0	1.63	0.36	− .012	− .006
S.	.848	− .004	.870	1.0	1.62	0.37	− .000	+ .006
S.	.819	− .001	.845	1.0	1.62	0.39	− .025	− .019
S.	48.817	+0.001	48.885	+1.0 *x*	+1.35 *y*	+0.96 *z*	= +0.015	+0.012
S.	.796	+ .000	.865	1.0	1.19	0.99	− .005	− .008
S.	.782	+ .003	.854	1.0	1.17	0.99	− .016	− .019
S.	.808	− .001	.876	1.0	1.17	0.99	+ .006	+ .003
S.	.804	+ .000	.873	1.0	1.12	1.00	+ .003	+ .000
S.	.807	− .000	.876	1.0	1.12	1.00	+ .006	+ .003
S.	.815	+ .003	.887	1.0	1.10	1.00	+ .017	+ .014
S.	.798	+ .001	.868	1.0	1.10	1.00	− .002	− .005
	Assumed Mean Difference:		48.870					

Normals:

			R	
+16.00 *x*	+ 5.83 *y*	− 8.50 *z*	= −0.038	
+ 5.83	+31.29	− 21.98	= +0.014	
− 8.50	−21.98	+119.68	= +0.338	

Solution:

	R	R	
x =	−0.0021	± 0.0033	Wt. 14.7
y =	+0.0024	± 0.0025	26.1
z =	+0.0023	± 0.0016	102.9

$[nn] = 0.00527$ $[vv] = 0.00463$ Prob. Error 1 Eq. = ± 0″.162

$\pi = +0''.032 \pm 0''.032$

10 Ursae maj.	B. D. +42°, 1956	Mag. 4.1	R. A. $8^h\ 51.2^m$	Decl. +42° 21′	Pos. Angle.
a	+42°, 1944	7.0	8 46.1	42 13	262°.6
b	+42°, 1965	8.6	8 56.9	42 17	94°.0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Nov. 6	4 54	2–3	26.5	268.241	298.259	—0.004	+0.005	566.501
	18	5 47	2	16.5	.193	.302	.003	.004	.496
	Dec. 4	5 57	2	22.5	.228	.290	.002	.003	.519
1895	May 5	12 39	3	59	268.223	298.338	+0.010	—0.011	566.560
	16	12 22	2–3	49.5	.177	.327	.010	.012	.502
	18	12 5	3	46	.195	.296	.011	.013	.489
1897	Apr. 19	13 27	3	29.5	268.158	298.393	+0.064	—0.076	566.539
	28	13 36	3	40.5	.174	.405	.065	.077	.567
	May 7	13 48	3–4	47.5	.140	.372	.066	.077	.501
1897	Dec. 24	5 17	3–4	9	268.112	298.365	+0.083	—0.098	566.462
	25	5 13	2	24	.125	.378	.083	.098	.488
	27	5 56	–	16.5	.119	.395	.084	.098	.500
						Assumed Annual Proper Motion and Mean Sum:	—0.028	+0.033	566.510

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.		R	R	Residuals. R
C.	30.018	+0.000	30.027	$+1.0\,x$	$-1.87\,y$	$-0.15\,z$ =	—0.057	—0.045
C.	.109	+ .001	.117	1.0	1.79	0.12	+ .033	+ .044
C.	.062	— .000	.067	1.0	1.58	0.08	— .017	— .007
C.	30.115	—0.003	30.091	$+1.0\,x$	$+1.90\,y$	$+0.34\,z$ =	+0.007	—0.004
C.	.150	+ .000	.128	1.0	1.85	0.37	+ .044	+ .034
C.	.101	+ .001	.078	1.0	1.84	0.38	— .006	— .016
C.	30.235	—0.002	30.093	$+1.0\,x$	$+1.88\,y$	$+2.30\,z$ =	+0.009	—0.002
C.	.231	— .003	.086	1.0	1.92	2.32	+ .002	— .009
C.	.232	+ .000	.089	1.0	1.90	2.35	+ .005	— .006
C.	30.253	+0.003	30.075	$+1.0\,x$	$-1.16\,y$	$+2.98\,z$ =	—0.009	—0.002
C.	.253	+ .001	.073	1.0	1.14	2.98	— .011	— .004
C.	.276	+ .001	.095	1.0	1.10	2.99	+ .011	+ .018
			Assumed Mean Difference:	30.084				

Normals: $+12.00\,x + 2.65\,y + 16.66\,z = +0.011$ (R)
$+2.65 + 34.31 + 5.73 = +0.201$
$+16.66 + 5.73 + 43.33 = +0.032$

Solution: $x = -0.0007 \pm 0.0072$ (R) Wt. 5.57
$y = +0.0059 \pm 0.0029$ (R) 33.52
$z = +0.0002 \pm 0.0039$ (R) 19.99

$[nn] = 0.00708$ $[vv] = 0.00593$ Prob. Error 1 Eq. = $\pm$ 0.″218

$\pi = +$ 0.″075 $\pm$ 0.″038

81 π^1 Cancri	B. D. +15°, 2003	Mag. 7.0	R. A. 9^h 4.4^m	Decl. +15° 35′	Pos. Angle.
a	+15°, 1984	7.5	9 0.1	15 17	254°.3
b	+15°, 2009	5.8	9 7.2	15 33	93°.4

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 Dec. 20	5 48	3	16	299.592	197.821	—0.071	+0.077	497.419
22	6 0	–	12	.587	.813	.071	.077	.406
23	5 37	3	7.5	.576	.794	.071	.077	.376
1893 May 24	12 46	2–3	57	299.603	197.832	—0.056	+0.061	497.440
25	12 41	–	59	.573	.835	.056	.061	.413
1897 May 7	13 15	3–4	49.5	299.450	197.969	+0.082	—0.089	497.412
8	12 40	3	48	.435	.989	.082	.089	.414
19	13 9	3	55	.447	.989	.083	.090	.429
1897 Dec. 1	6 18	1–2	32	299.423	198.015	+0.102	—0.111	497.429
23	7 7	1–2	17	.412	.008	.104	.113	.411
24	6 36	3–4	8	.420	197.988	.104	.113	.397
Assumed Annual Proper Motion and Mean Sum:						—0.035	+0.038	497.413

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	101.771	—0.001	101.622	$+1.0\,x$	$+1.25\,y$	$-2.03\,z$	= —0.009	—0.008
C.	.774	+ .001	.627	1.0	1.21	2.03	— .004	— .004
C.	.782	+ .008	.642	1.0	1.19	2.03	+ .011	+ .011
C.	101.771	—0.006	101.648	$+1.0\,x$	$-1.73\,y$	$-1.61\,z$	= +0.017	+0.014
C.	.738	+ .000	.621	1.0	1.72	1.61	— .010	— .013
C.	101.481	+0.000	101.652	$+1.0\,x$	$-1.83\,y$	$+2.34\,z$	= +0.021	+0.019
C.	.446	— .000	.617	1.0	1.82	2.35	— .014	— .016
C.	.458	— .003	.628	1.0	1.76	2.38	— .003	— .005
C.	101.408	—0.003	101.618	$+1.0\,x$	$+1.61\,y$	$+2.91\,z$	= —0.013	—0.011
C.	.404	+ .000	.621	1.0	1.19	2.97	— .010	— .009
C.	.432	+ .003	.652	1.0	1.17	2.98	+ .021	+ .022
Assumed Mean Difference:			101.631					

Normals:

$$+11.00\,x - 1.24\,y + 6.62\,z = +0.007\ (R)$$
$$-1.24\,x + 25.53\,y - 2.89\,z = -0.031$$
$$+6.62\,x - 2.89\,y + 60.37\,z = -0.003$$

Solution:

	R	R	
$x =$	+0.0006	± 0.0033	Wt. 10.25
$y =$	—0.0012	± 0.0021	25.31
$z =$	—0.0002	± 0.0014	56.19

$[nn] = 0.00196$ $[vv] = 0.00192$ Prob. Error 1 Eq. = ± 0″.132

$\pi = -0''.015 \pm 0''.026$

Lal. 18286	B. D. +29°, 1883	Mag. 7.0	R. A. 9^h 9.3^m	Decl. +29° 11′	Pos. Angle.
a	+29°, 1874	8.0	9 1.9	29 39	286°.7
b	+28°, 1745	8.0	9 15.4	28 32	116°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Dec. 7	6 43	3–4	23.5	477.477	422.740	+0.032	−0.016	900.233
	19	6 5	3	26.5	.457	.735	.031	.016	.207
	20	5 42	2–3	16.5	.470	.721	.031	.015	.207
1894	Apr. 29	12 57	3	42	477.466	422.723	+0.020	−0.010	900.199
	May 3	13 7	3–4	48	.505	.756	.020	.010	.271
	12	12 47	2	54.5	.475	.721	.019	.010	.206
1895	May 23	13 24	3–4	57.5	477.518	422.715	−0.012	+0.006	900.227
	June 14	14 29	2	64	.542	.738	.013	.006	.273
1895	Oct. 18	6 34	2	44	477.514	422.681	−0.024	+0.012	900.183
	22	5 24	2–3	48	.520	.697	.024	.012	.205
	23	5 17	3	31.5	.487	.708	.024	.012	.183
	Assumed Annual Proper Motion and Mean Sum:						+0.044	−0.015	900.220

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	54.737	−0.001	54.784	+1.0 x	+1.60 y	−1.07 z =	+0.004	+0.002
C.	.722	+ .001	.770	1.0	1.27	1.04 =	− .010	− .011
C.	.749	+ .001	.796	1.0	1.24	1.03 =	+ .016	+ .014
C.	54.743	+0.001	54.774	+1.0 x	−2.00 y	−0.68 z =	−0.006	−0.007
C.	.749	− .003	.776	1.0	1.99	0.67 =	− .004	− .005
C.	.754	+ .001	.784	1.0	1.94	0.64 =	+ .004	+ .003
C.	54.803	−0.000	54.785	+1.0 x	−1.81 y	+0.39 z =	+0.005	+0.006
C.	.804	− .003	.782	1.0	1.37	0.45 =	+ .002	+ .003
C.	54.833	+ .002	54.799	+1.0 x	+1.94 y	+0.79 z =	+0.019	+0.020
C.	.823	+ .001	.788	1.0	1.96	0.80 =	+ .008	+ .009
C.	.779	+ .002	.745	1.0	1.97	0.81 =	− .035	− .034
	Assumed Mean Difference:		54.780					

Normals:

			R	
+11.00 x	+ 0.87 y	− 1.89 z	= + 0.003	
+ 0.87	+ 34.07	+ 2.99	= − 0.003	
− 1.89	+ 2.99	+ 6.88	= − 0.010	

Solution:

	R	R	
x =	+ 0.0000	± 0.0034	Wt. 10.39
y =	+ 0.0000	± 0.0019	32.50
z =	− 0.0014	± 0.0044	6.27

$[nn] = 0.00212$ $[vv] = 0.00210$ Prob. Error 1 Eq. = ± 0.″139

$\pi = + 0.''000 \pm 0.''024$

Lal. 18397	B. D. +40°, 2197	Mag. 7.5	R. A. $9^h\ 13.3^m$	Decl. +40° 51′	Pos. Angle.
a	+40°, 2180	8.5	9 6.7	41 0	277°.6
b	+40°, 2212	7.9	9 19.4	40 36	101°.1

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893 Dec. 12	6 7	3	15.5	353.908	337.837	−0.028	+0.015	691.732
20	4 52	3	15.5	.961	.799	.027	.014	.747
22	4 19	3–4	38.5	.971	.786	.027	.014	.744
1894 May 9	13 35	3–4	55.5	353.938	337.857	−0.017	+0.009	691.787
10	13 16	2–3	46.5	.971	.844	.017	.009	.807
12	13 20	2	54	.939	.797	.017	.009	.728
1895 May 23	13 59	3–4	58	353.931	337.866	+0.010	−0.005	691.802
June 11	14 37	3	67.5	.911	.854	.011	.006	.770
16	14 41	3	58.5	.950	.870	.012	.006	.826
1895 Oct. 17	5 17	3–4	34	353.879	337.833	+0.021	−0.011	691.722
23	4 39	2–3	32.5	.895	.804	.021	.011	.709
29	5 52	2	31	.889	.815	.021	.011	.714
Assumed Annual Proper Motion and Mean Sum:						−0.026	+0.014	691.757

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	16.071	+0.001	16.029	$+1.0\,x$	$+1.49\,y$	$-1.06\,z$	$= -0.065$	−0.071
C.	.162	+ .000	.121	1.0	1.31	1.03	+ .027	+ .021
C.	.185	+ .000	.144	1.0	1.27	1.03	+ .050	+ .045
C.	16.081	−0.001	16.054	$+1.0\,x$	$-1.95\,y$	$-0.65\,z$	$= -0.040$	−0.033
C.	.127	− .001	.100	1.0	1.95	0.65	+ .006	+ .013
C.	.142	+ .002	.118	1.0	1.94	0.64	+ .024	+ .031
C.	16.065	−0.001	16.079	$+1.0\,x$	$-1.86\,y$	$+0.39\,z$	$= -0.015$	−0.008
C.	.057	− .000	.074	1.0	1.54	0.44	− .020	− .014
C.	.080	− .002	.096	1.0	1.45	0.45	+ .002	+ .007
C.	16.046	+0.001	16.079	$+1.0\,x$	$+1.87\,y$	$+0.79\,z$	$= -0.015$	−0.022
C.	.091	+ .001	.124	1.0	1.92	0.81	+ .030	+ .022
C.	.074	+ .001	.107	1.0	1.97	0.82	+ .013	+ .005
Assumed Mean Difference:			16.094					

Normals:

$$+12.00\,x - 0.86\,y - 1.36\,z = -0.003$$
$$-0.86\,x + 35.91\,y + 2.08\,z = +0.132$$
$$-1.36\,x + 2.08\,y + 6.98\,z = +0.005$$

Solution:

	R	R	
$x =$	+ 0.0000	± 0.0069	Wt. 11.73
$y =$	+ 0.0037	± 0.0040	35.28
$z =$	− 0.0003	± 0.0092	6.72

$[nn] = 0.01158$ $\quad [vv] = 0.01110$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.300$

$$\pi = +0''.047 \pm 0''.050$$

d Ursae maj.	B. D. +70°, 565	Mag. 5.2	R. A. 9^h 21.6^m	Decl. +70° 29′	Pos. Angle.
a	+70°, 557	7.0	9 4.1	70 29	270°.7
b	+70°, 584	8.1	9 41.0	70 33	88°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901 May 6	13 27	3	44	415.334	459.493	0.000	0.000	874.827
12	13 31	2–3	53.5	.333	.505	.000	.000	.838
16	13 21	2–3	55.5	.325	.502	.000	.000	.827
31	13 48	3	52	.327	.496	.000	.000	.823
1901 Nov. 10	5 17	3–4	20.5	415.310	459.486	0.000	0.000	874.796
20	5 42	3–4	22	.277	.455	.000	.000	.732
21	5 19	2	26	.324	.466	.000	.000	.790
Dec. 25	6 54	2	29.5	.316	.469	.000	.000	.785
1905 June 8	14 55	3–4	49	415.304	459.530	0.000	0.000	874.834
14	14 55	3	67	.345	.557	.000	.000	.902
						0.000	0.000	874.816

Assumed Annual Proper Motion and Mean Sum : 0.000 0.000 874.816

Observer.	Difference. R	Scale Value Corrections. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	44.159	−0.001	44.158	$+1.0x$	$+1.91y$	$+0.34z$	$= -0.018$	−0.010
C.	.172	− .001	.171	1.0	1.89	0.36	− .005	+ .003
C.	.177	− .001	.176	1.0	1.89	0.37	+ .000	+ .008
C.	.169	− .000	.169	1.0	1.81	0.41	− .007	+ .000
C.	44.176	+0.001	44.177	$+1.0x$	$-1.84y$	$+0.86z$	$= +0.001$	+0.013
C.	.178	+ .004	.182	1.0	1.82	0.88	+ .006	+ .018
C.	.142	+ .001	.143	1.0	1.82	0.89	− .033	− .021
C.	.153	+ .002	.155	1.0	1.33	0.98	− .021	− .012
C.	44.226	−0.001	44.225	$+1.0x$	$+1.69y$	$+4.43z$	$= +0.049$	+0.009
C.	.212	− .004	.208	1.0	1.60	4.45	+ .032	− .008

Assumed Mean Difference : 44.176

Normals :

			R
$+10.00x$	$+3.98y$	$+13.97z$	$= +0.004$
$+3.98$	$+31.27$	$+11.28$	$= +0.153$
$+13.97$	$+11.28$	$+27.48$	$= +0.305$

Solution :

	R	R	
$x =$	-0.0174	± 0.0040	Wt. 5.49
$y =$	$+0.0028$	± 0.0018	28.31
$z =$	$+0.0120$	± 0.0020	22.64

$[nn] = 0.00539$ $[vv] = 0.00139$ Prob. Error 1 Eq. $= \pm 0''.122$

$\pi = +0''.036 \pm 0''.023$

11 Leonis min.	B. D. +36°, 1979	Mag. 5.5	R. A. 9^h 27.0^m	Decl. +36° 29′	Pos. Angle.
a	+37°, 1992	6.8	9 22.8	37 4	306.°3
b	+35°, 2034	7.0	9 31.2	36 0	119.°0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M Corrections. R	R	Corrected Sum. R
1893	Dec. 6	5 49	–	20.5	289.999	278.799	−0.040	+0.034	568.792
	12	7 1	3	14.5	290.009	.817	.039	.034	.820
	19	6 45	2–3	26	289.980	.797	.039	.033	.771
1894	Apr. 29	13 29	3	42.5	289.981	278.816	−0.025	+0.021	568.793
	May 3	13 41	3–4	47.5	290.009	.831	.025	.021	.836
	9	14 12	3–4	54.5	.000	.830	.024	.021	.827
1895	May 24	13 17	2–3	57.5	289.962	278.873	+0.014	−0.012	568.837
	June 8	14 4	3–4	61	.954	.839	.016	.014	.795
	9	14 17	3–4	62.5	.954	.868	.016	.014	.824
1895	Oct. 14	3 53	–	37	289.930	278.862	+0.029	−0.025	568.796
	17	5 51	3–4	33.5	.900	.844	.029	.025	.748
	22	6 0	2–3	48	.947	.884	.030	.026	.835
						Assumed Annual Proper Motion and Mean Sum:	−0.037	+0.032	568.806

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	11.200	+0.000	11.126	$+1.0\,x$	$+1.54\,y$	$-1.07\,z$ =	+0.004	+0.007
C.	.192	− .000	.119	1.0	1.39	1.06	− .003	+ .000
C.	.183	+ .001	.112	1.0	1.21	1.04	− .010	− .007
C.	11.165	+0.000	11.119	$+1.0\,x$	$-1.97\,y$	$-0.68\,z$ =	−0.003	−0.006
C.	.178	− .001	.131	1.0	1.95	0.67	+ .009	+ .006
C.	.170	− .000	.125	1.0	1.91	0.65	+ .003	+ .000
C.	11.089	−0.001	11.114	$+1.0\,x$	$-1.78\,y$	$+0.39\,z$ =	−0.008	−0.011
C.	.115	+ .000	.145	1.0	1.48	0.43	+ .023	+ .021
C.	.086	− .000	.116	1.0	1.46	0.44	− .006	− .008
C.	11.068	+0.000	11.122	$+1.0\,x$	$+1.84\,y$	$+0.78\,z$ =	+0.000	+0.004
C.	.056	+ .001	.111	1.0	1.87	0.79	− .011	− .006
C.	.063	− .001	.118	1.0	1.91	0.80	− .004	+ .001
	Assumed Mean Difference:		11.122					

Normals:

			R	
$+12.00\,x$	$-0.79\,y$	$-1.54\,z$	$=-0.006$	
-0.79	$+35.12$	$+1.99$	$=-0.068$	
-1.54	$+1.99$	$+7.06$	$=-0.005$	

Solution:

	R	R	
x =	−0.0007	± 0.0024	Wt. 6.76
y =	−0.0019	± 0.0011	34.55
z =	−0.0004	± 0.0019	11.66

$[nn] = 0.00100$ $[vv] = 0.00086$ Prob. Error 1 Eq. = ± 0.″084

$\pi = -0.''024 \pm 0.''014$

Lal. 19229	B. D. +14°, 2151	Mag. 8.2	R. A. $9^h\ 41.0^m$	Decl. +14° 28′	Pos. Angle.
a	+14°, 2136	6.0	9 35.8	14 40	281°.2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	P. M. Correction. R	Corrected Sum from Lal. 18286. R
1893	Dec.	7	7 11	3–4	23	362.602	+0.048	900.233
		19	7 11	2	26	.630	.047	.207
		22	5 56	3–4	39·5	.630	.046	.216 *
1894	Apr.	29	12 35	3	42	362.656	+0.031	900.199
	May	10	12 18	2–3	48.5	.640	.029	.225 *
		12	12 22	2	55·5	.631	.029	.206
1895	May	24	13 41	2–3	57.5	362.702	−0.018	900.250 *
	June	8	13 44	2–3	53	.726	.019	.250 *
		9	13 54	3–4	62.5	.689	.019	.250 *
1895	Oct.	18	7 1	2	43	362.684	−0.036	900.183
		22	6 28	2–3	47·5	.707	.036	.205
		23	5 45	3	31·5	.677	.036	.183
						Assumed Annual Proper Motion and Mean Sum:	+0.045	900.217

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	−0.006	362.644	$+1.0\,x$	$+0.89\,y$	$-1.07\,z$	$= -0.026$	−0.022
C.	+ .004	.681	1.0	0.78	1.04	+ .011	+ .014
C.	+ .000	.676	1.0	0.76	1.03	+ .006	+ .009
C.	+0.007	362.694	$+1.0\,x$	$-0.96\,y$	$-0.68\,z$	$= +0.024$	+0.019
C.	− .003	.666	1.0	0.99	0.65	− .004	− .009
C.	+ .004	.664	1.0	1.00	0.64	− .006	− .011
C.	−0.013	362.671	$+1.0\,x$	$-0.98\,y$	$+0.39\,z$	$= +0.001$	−0.003
C.	− .013	.694	1.0	0.89	0.43	+ .024	+ .020
C.	− .013	.657	1.0	0.88	0.43	− .013	− .017
C.	+0.014	362.662	$+1.0\,x$	$+0.87\,y$	$+0.79\,z$	$= -0.008$	−0.003
C.	+ .005	.676	1.0	0.90	0.80	+ .006	+ .011
C.	+ .014	.655	1.0	0.91	0.81	− .015	− .010

Assumed Mean Distance: 362.670

Normals:

$$+12.00\,x - 0.59\,y - 1.46\,z = +0.000^R$$
$$-0.59 + 9.80 + 0.40 = -0.049$$
$$-1.46 + 0.40 + 7.00 = -0.007$$

Solution:

$$x = -0.0003 \pm 0.0031 \quad \text{Wt. } 11.67$$
$$y = -0.0050 \pm 0.0034 \quad 9.76$$
$$z = -0.0008 \pm 0.0041 \quad 6.81$$

$[nn] = 0.00253$ $[vv] = 0.00228$ Prob. Error 1 Eq. $= \pm 0''.136$

$$\pi = -0''.063 \pm 0''.043$$

* Mean value for this epoch.

Groom. 1596	B. D. +56°, 1421	Mag. 8.2	R. A. $9^h\ 51.8^m$	Decl. +56° 19′	Pos. Angle.
a	+56°, 1412	8.2	9 43.6	56 27	278°.0
b	+56°, 1434	8.0	9 59.9	56 0	104°.8

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Dec.	3	5 56	1–2	21	324.388	332.492	−0.000	+0.001	656.881
		4	6 28	2	22.5	.396	.480	.000	.001	.877
1895	May	5	13 17	3	58	324.395	332.522	+0.000	−0.004	656.913
		9	13 29	2–3	65.5	.414	.525	.000	.004	.935
		15	13 12	3	45	.403	.550	.000	.004	.949
1897	May	7	14 23	3–4	47	324.412	332.534	+0.002	−0.028	656.920
		8	13 17	3	47	.409	.538	.002	.028	.921
		19	13 47	3	53.5	.393	.563	.002	.029	.929
1897	Dec.	23	6 29	–	17.5	324.375	332.509	+0.003	−0.036	656.851
		24	5 52	3–4	8.5	.400	.529	.003	.036	.896
		25	5 49	2	24	.381	.557	.003	.036	.907
							Assumed Annual Proper Motion and Mean Sum:	−0.001	+0.012	656.905

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	8.104	+0.000	8.105	$+1.0\,x$	$-1.77\,y$	$-0.08\,z$	$=-0.004$	+0.004
C.	.084	+ .000	.085	1.0	1.76	0.08	− .024	− .016
C.	8.127	−0.000	8.123	$+1.0\,x$	$+1.96\,y$	$+0.34\,z$	$=+0.014$	+0.006
C.	.111	− .000	.107	1.0	1.97	0.35	− .002	− .010
C.	.147	− .001	.142	1.0	1.98	0.37	+ .033	+ .024
C.	8.122	−0.000	8.092	$+1.0\,x$	$+1.97\,y$	$+2.34\,z$	$=-0.017$	−0.025
C.	.129	− .000	.099	1.0	1.97	2.35	− .010	− .018
C.	.170	− .000	.139	1.0	1.99	2.38	+ .030	+ .022
C.	8.134	+0.001	8.096	$+1.0\,x$	$-1.39\,y$	$+2.97\,z$	$=-0.013$	−0.007
C.	.129	+ .000	.090	1.0	1.37	2.98	− .019	− .013
C.	.176	− .000	.137	1.0	1.35	2.98	+ .028	+ .034
			Assumed Mean Difference: 8.109					

Normals:

$$+11.00\,x + 4.20\,y + 16.90\,z = +0.016$$
$$+4.20\,x + 35.22\,y + 4.10\,z = +0.150$$
$$+16.90\,x + 4.10\,y + 43.63\,z = +0.013$$

Solution:

	R	R	Wt.
$x =$	+0.0000	± 0.0069	4.25
$y =$	+0.0043	± 0.0025	33.31
$z =$	−0.0001	± 0.0034	17.50

$[nn] = 0.00448$ $[vv] = 0.00381$ Prob. Error 1 Eq. $= \pm 0''.181$

$$\pi = +0''.055 \pm 0''.032$$

Lal. 19821	B. D. +24°, 2193	Mag. 8.3	R. A. 10h 3.8m	Decl. +24° 28′	Pos. Angle.
a	+24°, 2177	8.1	9 58.0	24 32	273°.3
b	+24°, 2207	7.0	10 8.5	24 14	102°.8

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b* R	P. M. Corrections. R	R	Corrected Sum. R
1895	Dec. 29	7	7	2	33	372.140	314.712	−0.154	+0.140	686.838
1896	Jan. 1	7	8	3	25	.127	.695	.154	.140	.808
	12	7	26	3	27	.108	.704	.153	.139	.798
1902	May 16	14	37	3	56	371.985	314.847	−0.014	+0.013	686.831
	17	13	21	2	61	.971	.827	.014	.013	.797
	21	13	51	2	51	.978	.833	.013	.012	.810
	28	13	35	4	44	.978	.835	.013	.012	.812
	29	14	0			.986	.841	.013	.012	.826
1903	Nov. 25	5	57	4	16	371.950	314.867	+0.020	−0.018	686.819
	26	6	2	3–4	14	.940	.836	.020	.018	.778
	27	6	53	3–4	14	.957	.848	.020	.018	.807
	Dec. 8	6	0	3	26	.959	.874	.021	.019	.835
	10	6	30	3	27	.961	.884	.021	.019	.847
	11	5	50	3	24	.951	.866	.021	.019	.819
								Assumed Annual Proper Motion and Mean Sum:	−0.022	+0.020	686.816

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	57.428	−0.002	57.132	$+1.0\,x$	$+1.42\,y$	$-7.01\,z$	$= +0.012$	+0.004
E.	.432	+ .001	.139	1.0	1.37	7.00	+ .019	+ .011
E.	.404	+ .001	.113	1.0	1.10	6.97	− .007	− .014
S.	57.138	−0.001	57.110	$+1.0\,x$	$-1.98\,y$	$-0.63\,z$	$= -0.010$	−0.007
S.	.144	+ .002	.119	1.0	1.98	0.63	− .001	+ .002
S.	.145	+ .000	.120	1.0	1.98	0.61	+ .000	+ .003
S.	.143	+ .000	.118	1.0	1.95	0.59	− .002	+ .001
S.	.145	− .001	.119	1.0	1.95	0.59	− .001	+ .002
S.	57.083	+0.000	57.121	$+1.0\,x$	$+1.93\,y$	$+0.90\,z$	$= +0.001$	−0.009
S.	.104	+ .003	.145	1.0	1.92	0.90	+ .025	+ .015
S.	.109	+ .001	.148	1.0	1.91	0.91	+ .028	+ .018
S.	.085	− .002	.123	1.0	1.80	0.93	+ .003	− .007
S.	.077	− .003	.114	1.0	1.77	0.94	− .006	− .015
S.	.085	+ .000	.125	1.0	1.76	0.94	+ .005	− .004
	Assumed Mean Difference:		57.120					

Normals:

			R
$+14.00\,x$	$+5.14\,y$	$-18.51\,z$	$= +0.066$
$+5.14$	$+45.00$	-11.00	$= +0.169$
-18.51	-11.00	$+153.67$	$= -0.109$

Solution:

	R	R	Wt.
$x =$	$+0.0035$	± 0.0022	11.4
$y =$	$+0.0034$	± 0.0011	43.0
$z =$	-0.0000	± 0.0006	128.8

$[nn] = 0.00214$ $[vv] = 0.00132$ Prob. Error 1 Eq. $= \pm 0''.094$

$\pi = +0''.043 \pm 0''.014$

Lal. 19896	B. D. +3°, 2338	Mag. 7.8	R. A. $10^h\ 6.6^m$	Decl. +3° 52′	Pos. Angle.
a	+3°, 2334	7·5	10 5·7	3 47	247°.9

Date.		Sid. Time.	Def.	Temp.	Distance *a*.	P. M. Correction.	Corrected Sum from 39 Leonis.
		h. m.		°	R	R	R
1895	Dec. 29	7 48	2	32	67.350	+0.113	351.397
1896	Jan. 1	7 48	2	24	.361	.113	.342
	12	8 1	3	26	.345	.112	.385
1902	May 29	13 0	3	54	67.458	+0.010	351.420
	31	13 14	2	56	.453	.010	.390
	June 1	13 22	2	59	.463	.009	.402
	4	13 16	3	67	.452	.009	.411
	5	13 31	3	65	.457	.009	.385
1903	Nov. 3	7 5	3	51	67.466	−0.014	351.389
	9	7 2	3	41	.459	.014	.391
	19	8 9	3	19	.455	.014	.369
	20	7 30	3	20	.451	.014	.366
	23	7 13	2	27	.444	.015	.367
	24	6 53	2–3	24	.465	.015	.385
					Assumed Annual Proper Motion and Mean Sum:	+0.016	351.386

Observer.	Scale Value Correction.	Corrected Distance.	Equations of Condition.				Residuals.
	R	R				R	R
E.	−0.002	67.461	+1.0 x	+0.53 y	−7.01 z =	+0.008	−0.005
E.	+ .008	.482	1.0	0.50	7.00	+ .029	+ .015
E.	+ .000	.457	1.0	0.40	6.97	+ .004	− .010
S.	−0.007	67.461	+1.0 x	−0.73 y	−0.59 z =	+0.008	−0.002
S.	− .001	.462	1.0	0.72	0.59	+ .009	− .001
S.	− .003	.469	1.0	0.72	0.58	+ .016	+ .006
S.	− .005	.456	1.0	0.71	0.58	+ .003	− .007
S.	+ .000	.466	1.0	0.70	0.57	+ .013	+ .004
S.	−0.001	67.451	+1.0 x	+0.71 y	+0.84 z =	−0.002	+0.007
S.	− .001	.444	1.0	0.72	0.86	− .009	+ .000
S.	+ .003	.444	1.0	0.72	0.88	− .009	+ .000
S.	+ .004	.441	1.0	0.72	0.89	− .012	− .003
S.	+ .003	.432	1.0	0.73	0.90	− .021	− .012
S.	+ .000	.450	1.0	0.73	0.90	− .003	+ .006
	Assumed Mean Distance:	67.453					

Normals:

			R		R	R	
+ 14.00 x	+ 2.18 y	− 18.62 z	= +0.034	*Solution:* x =	+0.0006	± 0.0017	Wt. 11.3
+ 2.18	+ 6.37	− 4.12	= −0.054	y =	−0.0104	± 0.0022	6.0
− 18.62	− 4.12	+ 153.06	= −0.366	z =	−0.0026	± 0.0005	128.0

$[nn] = 0.00226$ $[vv]$ 0.00068 Prob. Error 1 Eq. = ± 0″.067

$\pi = -0''.132 \pm 0''.028$

39 Leonis	B. D. +23°, 2207	Mag. 6.5	R. A. 10^h 9.3^m	Decl. +23° 50′	Pos. Angle.
a	+24°, 2207	7.0	10 8.5	+24 14	336°.7
b	+23°, 2213	7.9	10 11.6	+23 14	137°.7

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1895 Dec. 29	7 33	2	32	121.321	229.915	+0.035	+0.126	351.397
1896 Jan. 1	7 25	–	23	.296	.885	.035	.126	.342
12	7 45	3	26	.319	.906	.035	.125	.385
1902 May 29	13 29	3	53	121.353	230.053	+0.003	+0.011	351.420
31	13 36	2	55	.339	.037	.003	.011	.390
June 1	13 35	2	58	.354	.035	.003	.010	.402
4	14 21	3	64	.344	.054	.003	.010	.411
5	13 51	3	64	.327	.045	.003	.010	.385
1903 Nov. 3	6 6	3	52	121.351	230.057	−0.004	−0.015	351.389
9	6 6	3	41	.352	.058	.004	.015	.391
19	6 28	3	22	.358	.031	.004	.016	.369
20	7 4	3	23	.350	.036	.004	.016	.366
23	5 45	2	29	.350	.038	.004	.016	.368
24	6 25	2–3	26	.347	.059	.004	.016	.386
Assumed Annual Proper Motion and Mean Sum:						+0.005	+0.018	351.386

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	108.594	−0.003	108.682	+1.1 x	−1.01 y	−7.01 z =	−0.006	−0.002
E.	.589	+ .014	.694	1.1	0.93	7.00	+ .006	+ .010
E.	.587	+ .000	.677	1.1	0.69	6.97	− .011	− .009
S.	108.700	−0.011	108.697	+1.0 x	+1.55 y	−0.59 z =	+0.009	−0.007
S.	.698	− .001	.705	1.0	1.53	0.59	+ .017	+ .000
S.	.681	− .005	.683	1.0	1.51	0.58	− .005	− .021
S.	.710	− .008	.709	1.0	1.48	0.58	+ .021	+ .006
S.	.718	+ .000	.725	1.0	1.47	0.57	+ .037	+ .022
S.	108.706	−0.001	108.694	+1.0 x	−1.58 y	+0.84 z =	+ .006	+0.008
S.	.706	− .002	.693	1.0	1.59	0.86	+ .005	+ .007
S.	.673	+ .005	.666	1.0	1.57	0.88	− .022	− .020
S.	.686	+ .006	.680	1.0	1.57	0.89	− .008	− .006
S.	.688	+ .006	.682	1.0	1.56	0.90	− .006	− .004
S.	.712	+ .000	.700	1.0	1.55	0.90	+ .012	+ .014
Assumed Mean Difference:			108.688					

Normals:

$$+14.00\,x - 4.51\,y - 18.62\,z = +0.055$$
$$-4.51 + 28.52 + 5.75 = +0.146$$
$$-18.62 + 5.75 + 153.06 = +0.019$$

Solution:

$$x = +0.0069 \pm 0.0027 \quad \text{Wt. } 11.2$$
$$y = +0.0060 \pm 0.0017 \quad 27.1$$
$$z = +0.0007 \pm 0.0008 \quad 128.3$$

$[nn] = 0.00319$ $[vv] = 0.00196$ Prob. Error 1 Eq. $= \pm 0''.114$

$$\pi = +0''.076 \pm 0''.022$$

μ Ursae maj.	B. D. +42°, 2115	Mag. 3.1	R. A. 10^h 13.7^m	Decl. +42° 14′	Pos. Angle.
a	+41°, 2066	7.3	10 7.9	42 0	257°.9
b	+42°, 2123	7.0	10 18.9	42 20	83°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	June 9	14 53	3	56.5	310.454	274.305	0.000	0.000	584.759
	11	15 11	3	61.5	.468	.310	.000	.000	.778
	12	15 14	2–3	69	.475	.321	.000	.000	.796
	16	14 58	2–3	56	.472	.306	.000	.000	.778
1901	Oct. 18	6 23	4	39	310.465	274.298	0.000	0.000	584.763
	19	6 9	3	40.5	.453	.282	.000	.000	.735
	20	6 8	2	37	.444	.281	.000	.000	.725
	Nov. 1	6 13	–	42	.456	.307	.000	.000	.763
	3	5 59	3–4	34.5	.459	.291	.000	.000	.750
	9	6 7	1–2	35.5	.451	.291	.000	.000	.742
1902	May 20	15 23	3–4	47.5	310.463	274.290	0.000	0.000	584.753
	24	15 36	3–4	62.5	.456	.331	.000	.000	.787
	28	15 20	3–4	41	.437	.287	.000	.000	.724
	29	14 48	2	48.5	.430	.301	.000	.000	.731
	June 6	15 44	3–4	56.5	.466	.308	.000	.000	.774
					Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	584.757

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	36.149	+0.000	36.149	$+1.0x$	$-1.71y$	$-0.56z$ =	−0.007	−0.007
C.	.158	− .001	.157	1.0	1.70	0.56	+ .001	+ .001
C.	.154	− .002	.152	1.0	1.69	0.56	− .004	− .004
C.	.166	− .001	.165	1.0	1.66	0.55	+ .009	+ .009
C.	36.167	−0.000	36.167	$+1.0x$	$+1.30y$	$-0.21z$ =	+0.011	+0.004
C.	.171	+ .001	.172	1.0	1.32	0.20	+ .016	+ .009
C.	.163	+ .002	.165	1.0	1.34	0.20	+ .009	+ .002
C.	.149	− .000	.149	1.0	1.53	0.17	− .007	− .015
C.	.168	+ .000	.168	1.0	1.55	0.16	+ .012	+ .004
C.	.160	+ .001	.161	1.0	1.61	0.15	+ .005	− .003
C.	36.173	+0.000	36.173	$+1.0x$	$+1.76y$	$+0.38z$ =	+0.017	+0.026
C.	.125	− .002	.123	1.0	1.77	0.39	− .033	− .024
C.	.150	+ .002	.152	1.0	1.77	0.40	− .004	+ .005
C.	.129	+ .002	.131	1.0	1.77	0.40	− .025	− .016
C.	.158	− .001	.157	1.0	1.73	0.43	+ .001	+ .010
	Assumed Mean Difference:		36.156					

Normals:

			R	
$+15.00x$	$-6.91y$	$-1.32z$	$= +0.001$	Wt. 12.71
-6.91	$+39.44$	-1.29	$= +0.142$	34.56
-1.32	-1.29	$+2.25$	$= -0.026$	2.03

Solution:

	R	R	
x =	+0.0009	± 0.0025	
y =	+0.0035	± 0.0015	
z =	−0.0089	± 0.0063	

$[nn] = 0.00284$ $[vv] = 0.00211$ Prob. Error 1 Eq. = $\pm$ 0.″114

$\pi = +$ 0.″044 $\pm$ 0.″019

Lal. 20881	B. D. +21°, 2247	Mag. 7.9	R. A. $10^h\ 43.7^m$	Decl. +21° 3′	Pos. Angle.
a	+21°, 2236	8.5	10 39.5	21 33	296°.7
b	+20°, 2532	8.6	10 48.3	20 30	117°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Jan. 2	6 54	3–4	26	311.264	346.769	0.000	0.000	658.033
	19	8 47	3	24	.303	.746	.000	.000	.049
	Mar. 3	7 35	2	36	.291	.771	.000	.000	.062
1895	May 24	14 29	2–3	56	311.316	346.781	0.000	0.000	658.097
	June 6	14 15	2–3	55.5	.318	.768	.000	.000	.086
	11	15 8	3	67	.318	.771	.000	.000	.089
1895	Oct. 28	6 40	2	30.5	311.271	346.752	0.000	0.000	658.023
	29	6 40	2	31	.288	.779	.000	.000	.067
	Nov. 21	9 34	2	19	.290	.716	.000	.000	.006
1897	May 29	14 22	3	53.5	311.312	346.766	0.000	0.000	658.078
	29	15 0	3	52.5	.274	.799	.000	.000	.073
1897	Dec. 25	7 13	1–2	24	311.313	346.754	0.000	0.000	658.067
	27	6 27	–	16.5	.298	.777	.000	.000	.075
	28	6 32	3	11.5	.295	.784	.000	.000	.079
	28	7 6	3	11	.301	.776	.000	.000	.077
						Assumed Annual Proper Motion and Mean Sum:	0.000	0.000	658.064

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	35.505	+0.002	35.507	$+1.0\,x$	$-1.51\,y$	$-0.99\,z$	$= +0.035$	+0.039
C.	.443	+ .001	.444	1.0	1.35	0.95	$= -.028$	− .024
C.	.480	+ .000	.480	1.0	+0.36	0.83	$= +.008$	+ .012
C.	35.465	−0.002	35.463	$+1.0\,x$	$+2.02\,y$	$+0.39\,z$	$= -0.009$	−0.006
C.	.450	− .001	.449	1.0	1.97	0.43	$= -.023$	− .020
C.	.453	− .001	.452	1.0	1.92	0.44	$= -.020$	− .017
C.	35.481	+0.002	35.483	$+1.0\,x$	$-1.75\,y$	$+0.82\,z$	$= +0.011$	+0.013
C.	.491	− .000	.491	1.0	1.76	0.83	$= +.019$	+ .021
C.	.426	+ .003	.429	1.0	1.95	0.89	$= -.043$	− .041
C.	35.454	−0.001	35.453	$+1.0\,x$	$+2.02\,y$	$+2.41\,z$	$= -0.019$	−0.019
C.	.525	− .000	.525	1.0	2.02	2.41	$= +.053$	+ .053
C.	35.441	−0.000	35.441	$+1.0\,x$	$-1.66\,y$	$+2.98\,z$	$= -0.031$	−0.032
C.	.479	− .001	.478	1.0	1.63	2.99	$= +.006$	+ .005
C.	.489	− .001	.488	1.0	1.61	2.99	$= +.016$	+ .015
C.	.475	− .001	.474	1.0	1.61	2.99	$= +.002$	+ .001
	Assumed Mean Difference:		35.472					

Normals:

R				
$+15.00\,x$	$-4.52\,y$	$+17.80\,z$	$=-0.023$	
-4.52	$+44.60$	-9.38	$=+0.000$	
$+17.80$	-9.38	$+52.58$	$=+0.012$	

Solution:

	R	R	
$x =$	-0.0030	± 0.0064	Wt. 8.93
$y =$	-0.0000	± 0.0029	42.72
$z =$	$+0.0012$	± 0.0034	31.09

$[nn] = 0.00984$ $[vv] = 0.00973$ Prob. Error 1 Eq. $= \pm 0''.244$

$\pi = -0''.000 \pm 0''.037$

Groom. 1697	B. D. +70°, 634	Mag. 6.0	R. A. $10^h\ 43.6^m$	Decl. +70° 37′	Pos. Angle.
a	+70°, 620	7.7	10 29.1	70 54	283°.1
b	+70°, 647	8.6	10 58.1	70 20	104°.2

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901 May 12	14 29	2–3	52	345.690	357.207	0.000	0.000	702.897
16	14 5	2–3	54	.654	.168	.000	.000	.822
21	13 55	2–3	53	.670	.178	.000	.000	.848
June 4	14 37	3–4	64	.649	.188	.000	.000	.837
1901 Oct. 18	5 27	4	39	345.643	357.207	0.000	0.000	702.850
19	5 16	3	41.5	.642	.207	.000	.000	.849
20	5 0	2	41.5	.662	.182	.000	.000	.844
Nov. 1	5 28	–	43	.678	.193	.000	.000	.871
3	5 9	3–4	36	.624	.187	.000	.000	.811
9	5 22	1–2	36	.646	.210	.000	.000	.856
1902 May 20	16 5	3–4	48	345.657	357.230	0.000	0.000	702.887
28	16 1	3–4	41.5	.644	.200	.000	.000	.844
29	15 25	2	48.5	.629	.235	.000	.000	.864
June 17	16 40	3	56	.650	.226	.000	.000	.876
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	702.854

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	11.517	−0.001	11.516	$+1.0\,x$	$+1.93\,y$	$-0.64\,z$ =	−0.033	−0.002
C.	.514	+ .001	.515	1.0	1.93	0.63	− .034	− .003
C.	.508	+ .000	.508	1.0	1.94	0.62	− .041	− .011
C.	.539	+ .000	.539	1.0	1.85	0.58	− .010	+ .018
C.	11.564	+0.000	11.564	$+1.0\,x$	$-1.63\,y$	$-0.21\,z$ =	+0.015	+0.017
C.	.565	+ .000	.565	1.0	1.65	0.20	+ .016	+ .018
C.	.520	+ .000	.520	1.0	1.67	0.20	− .029	− .027
C.	.515	− .000	.515	1.0	1.83	0.17	− .034	− .034
C.	.563	+ .001	.564	1.0	1.84	0.16	+ .015	+ .014
C.	.564	− .000	.564	1.0	1.87	0.15	+ .015	+ .013
C.	11.573	−0.001	11.572	$+1.0\,x$	$+1.94\,y$	$+0.38\,z$ =	+0.023	−0.004
C.	.556	+ .000	.556	1.0	1.92	0.40	+ .007	− .021
C.	.606	− .000	.606	1.0	1.92	0.41	+ .057	+ .028
C.	.576	− .000	.576	1.0	1.69	0.46	+ .027	− .005
Assumed Mean Difference:	11.549							

Normals:

			R
$+14.00\,x$	$+4.63\,y$	$-1.91\,z$	$= -0.006$
$+4.63$	$+47.03$	$+0.24$	$= -0.011$
-1.91	$+0.24$	$+2.41$	$= +0.122$

Solution:

	R	R	
x =	+0.0077	± 0.0040	Wt. 12.00
y =	−0.0013	± 0.0020	45.15
z =	+0.0569	± 0.0095	2.13

$[nn] = 0.01151$ $[vv] = 0.00460$ Prob. Error 1 Eq. = ± 0″.175

$\pi = -0''.016 \pm 0''.026$

Lal. 21008–10	B. D. +28°, 1952	Mag. 8.3	R. A. $10^h\ 48.4^m$	Decl. +28° 30′	Pos. Angle.
a	+28°, 1931	6.3	10 41.9	28 45	279°.0
b	+27°, 1968	8.0	10 53.1	27 54	120°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Jan. 27	8 11	2–3	19	408.990	339.291	—0.026	+0.021	748.276
	Mar. 3	8 9	2	35.5	409.020	.298	.023	.019	.314
1894	June 17	14 51	3–4	73.5	409.023	339.361	—0.015	+0.012	748.381
	18	14 56	3–4	68.5	.080	.330	.015	.012	.407
	28	15 41	2–3	72	.024	.372	.014	.012	.394
1895	June 6	14 45	2–3	54	409.003	339.379	+0.012	—0.010	748.384
	8	14 54	3–4	60	.005	.336	.012	.010	.343
	14	15 39	2	62.5	.006	.385	.013	.010	.394
1895	Oct. 23	6 11	3	30.5	408.989	339.308	+0.023	—0.019	748.301
	28	7 17	2	30	.977	.361	.023	.019	.342
	Nov. 21	8 17	2	19	.936	.356	.025	.020	.297
					Assumed Annual Proper Motion and Mean Sum:		—0.028	+0.023	748.344

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	69.699	+0.006	69.658	$+1.0\,x$	$+0.84\,y$	$-0.93\,z$	$= -0.006$	—0.011
C.	.722	+ .003	.683	1.0	—0.35	0.83	+ .019	+ .018
C.	69.662	—0.003	69.632	$+1.0\,x$	$-1.82\,y$	$-0.54\,z$	$= -0.032$	—0.028
C.	.750	— .006	.717	1.0	1.81	0.54	+ .053	+ .058
C.	.652	— .005	.621	1.0	1.67	0.51	— .043	— .039
C.	69.624	—0.004	69.642	$+1.0\,x$	$-1.93\,y$	$+0.43\,z$	$= -0.022$	—0.016
C.	.669	+ .000	.691	1.0	1.91	0.43	+ .027	+ .033
C.	.621	— .005	.639	1.0	1.85	0.45	— .025	— .019
C.	69.681	+0.004	69.727	$+1.0\,x$	$+1.65\,y$	$+0.81\,z$	$= +0.063$	+0.058
C.	.616	+ .000	.658	1.0	1.72	0.82	— .006	— .011
C.	.580	+ .004	.629	1.0	1.90	0.89	— .035	— .041
	Assumed Mean Difference: 69.664							

Normals:

$$+11.00\,x - 5.23\,y + 0.48\,z = -0.007$$
$$-5.23 + 30.29 + 4.28 = +0.086$$
$$+0.48 + 4.28 + 5.08 = +0.007$$

Solution:

$$x = +0.0010 \pm 0.0086 \quad \text{Wt. } 9.76$$
$$y = +0.0032 \pm 0.0055 \quad 23.78$$
$$z = -0.0013 \pm 0.0130 \quad 4.33$$

$[nn] = 0.01315$ $[vv] = 0.01286$ Prob. Error 1 Eq. $= \pm 0''.342$

$$\pi = +0''.040 \pm 0''.070$$

51 Leonis min.	B. D. +25°, 2335	Mag. 7.8	R. A. 10^h 57.5^m	Decl. +25° 59′	Pos. Angle.
a	+26°, 2159	8.4	10 50.9	26 28	288°.1
b	+25°, 2352	8.1	11 4.7	25 26	108°.6

Date.		Sid. Time h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Jan. 19	9	20	3	23.5	441.610	488.465	−0.013	+0.038	930.100
	27	8	47	2–3	18	.620	.497	.013	.037	.141
	Mar. 3	8	42	2	35	.625	.503	.012	.033	.149
1894	June 17	15	40	3–4	72	441.661	488.569	−0.008	+0.022	930.244
	18	15	28	3–4	68	.610	.556	.008	.022	.180
	July 7	16	14	2	59	.607	.553	.007	.020	.173
1895	June 6	15	13	2–3	53.5	441.619	488.585	+0.006	−0.017	930.193
	9	14	52	3–4	61	.642	.590	.006	.018	.220
	14	15	3	2	63	.624	.582	.006	.018	.194
1895	Oct. 28	7	53	2	29.5	441.591	488.598	+0.011	−0.033	930.167
	29	7	23	1–2	27.5	.606	.542	.011	.033	.127
	Nov. 21	8	54	2	19	.538	.571	.012	.036	.085
							Assumed Annual Proper Motion and Mean Sum:	−0.014	+0.040	930.164

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	46.855	+0.003	46.909	$+1.0\,x$	$-1.19\,y$	$-0.95\,z$	$= -0.031$	−0.022
C.	.877	+ .001	.928	1.0	0.97	0.93	− .012	− .003
C.	.878	+ .001	.924	1.0	+0.22	0.83	− .016	− .011
C.	46.908	−0.004	46.934	$+1.0\,x$	$+1.91\,y$	$-0.54\,z$	$= -0.006$	−0.006
C.	.946	− .001	.975	1.0	1.90	0.54	+ .035	+ .035
C.	.946	− .000	.973	1.0	1.58	0.49	+ .033	+ .033
C.	46.966	−0.001	46.942	$+1.0\,x$	$+1.99\,y$	$+0.43\,z$	$= +0.002$	−0.005
C.	.948	− .003	.921	1.0	1.97	0.44	− .019	− .026
C.	.958	− .001	.933	1.0	1.93	0.45	− .007	− .014
C.	47.007	−0.000	46.963	$+1.0\,x$	$-1.74\,y$	$+0.82\,z$	$= +0.023$	+0.020
C.	46.936	+ .002	.894	1.0	1.76	0.83	− .046	− .048
C.	47.033	+ .004	.989	1.0	1.94	0.89	+ .049	+ .047
	Assumed Mean Difference:		46.940					

Normals:

			R	
$+12.00\,x$	$+3.90\,y$	$-0.42\,z$	$= +0.005$	Wt. 11.55
$+3.90$	$+33.62$	-2.98	$= +0.052$	31.01
-0.42	-2.98	$+6.00$	$= +0.036$	5.74

Solution:

	R	R	
$x =$	$+0.0000$	± 0.0062	
$y =$	$+0.0022$	± 0.0038	
$z =$	$+0.0070$	± 0.0087	

$[nn] = 0.00917$ $\quad [vv] = 0.00881$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.267$

$\pi = +0''.027 \pm 0''.048$

Lal. 21368	B. D. +31°, 2240	Mag. 8.5	R. A. 11^h 3.1^m	Decl. +31° 15′	Pos. Angle.
b	+31°, 2242	8.2	11 4.5	31 1	129°.8

Date.		Sid. Time.	Def.	Temp.	Distance *b*.	P. M. Correction.	Corrected Sum from ξ Urs. maj. and 8 Can. ven.
		h. m.		°	R	R	R
1896	Jan. 14	8 4	3	16	102.883	—0.268	968.611
	29	7 41	3	28	.872	.267	.502
	30	7 45	2	28	.874	.267	.542
1902	Jan. 16	8 18	3–4	23.5	102.594	+0.002	968.516
	23	8 24	3–4	26	.608	.003	.557
	25	7 14	2–3	25	.605	.003	.524
	27	8 1	2–3	23.5	.606	.003	.545
	30	8 10	3	11.5	.621	.004	.576
	Feb. 3	7 46	2–3	14.5	.603	.004	.503
1902	May 31	14 45	3	52	102.589	+0.018	968.496
	June 1	14 45	3	55.5	.591	.019	.559
	8	14 58	3–4	53	.597	.019	.581
	9	14 49	2–3	53	.608	.020	.544
	12	15 17	2	64	.587	.020	.522
	17	15 19	1–2	58	.596	.021	.521
					Assumed Annual Proper Motion and Mean Sum:	—0.045	968.536

Observer.	Scale Value Correction.	Corrected Distance.	Equations of Condition.				Residuals.
	R	R				R	R
E.	—0.008	102.607	+1.0 x	—0.53 y	—5.96 z	= —0.005	+0.001
E.	+ .004	.609	1.0	0.32	5.92	= — .003	+ .002
E.	— .001	.606	1.0	0.30	5.92	= — .006	— .002
C.	+0.002	102.598	+1.0 x	—0.51 y	+0.04 z	= —0.014	—0.011
C.	— .002	.609	1.0	0.41	0.06	= — .003	+ .000
C.	+ .001	.609	1.0	0.38	0.07	= — .003	+ .000
C.	— .001	.608	1.0	0.35	0.07	= — .004	— .001
C.	— .004	.621	1.0	0.30	0.08	= + .009	+ .012
C.	+ .003	.610	1.0	0.24	0.09	= — .002	+ .000
C.	+0.004	102.611	+1.0 x	+0.97 y	+0.41 z	= —0.001	—0.003
C.	— .002	.608	1.0	0.97	0.41	= — .004	— .006
C.	— .005	.611	1.0	0.94	0.43	= — .001	— .003
C.	— .001	.627	1.0	0.93	0.44	= + .015	+ .013
C.	+ .001	.608	1.0	0.91	0.44	= — .004	— .006
C.	+ .001	.618	1.0	0.87	0.46	= + .006	+ .004
Assumed Mean Distance:		102.612					

Normals:

			R	
+15.00 x	+2.25 y	−14.80 z	= −0.020	Wt. 10.80
+ 2.25	+6.53	+ 9.12	= +0.022	4.81
−14.80	+9.12	+106.77	= +0.089	71.45

Solution:

	R	R
x	= −0.0015	± 0.0014
y	= +0.0034	± 0.0021
z	= +0.0003	± 0.0005

$[nn] = 0.00068$ $[vv] = 0.00055$ Prob. Error 1 Eq. = ± 0″.058

$\pi = +0''.043 \pm 0''.026$

Groom. 1757	B. D. +50°, 1807	Mag. 6.0	R. A. 11h 8.5m	Decl. +50° 16′	Pos. Angle.
a	+49°, 2018	8.4	10 59.3	49 58	258°.4
b	+50°, 1820	7.8	11 17.2	50 10	93°.9

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901 June 9	15 44	3	56.5	429.936	397.233	0.000	0.000	827.169
11	15 53	3	61	.929	.225	.000	.000	.154
12	15 51	3	68.5	.955	.258	.000	.000	.213
16	15 36	3	55.5	.935	.223	.000	.000	.158
1901 Nov. 10	7 25	3–4	21	429.875	397.225	0.000	0.000	827.100
20	6 27	3–4	22.5	.872	.214	.000	.000	.086
21	6 23	2	25.5	.900	.211	.000	.000	.111
25	6 37	2	30	.916	.214	.000	.000	.130
1905 June 14	15 42	3	66	429.963	397.264	0.000	0.000	827.227
15	15 54	2	67	.923	.258	.000	.000	.181
Assumed Annual Proper Motion and Mean Sum :						0.000	0.000	827.153

Observer.	Difference. R	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	32.703	−0.001	32.702	$+1.0x$	$-1.81y$	$-0.56z$	$= +0.014$	−0.001
C.	.704	− .000	.704	1.0	1.80	0.56	$= +.016$	+ .001
C.	.697	− .002	.695	1.0	1.80	0.56	$= +.007$	− .008
C.	.712	− .000	.712	1.0	1.79	0.55	$= +.024$	+ .009
C.	32.650	+0.002	32.652	$+1.0x$	$+1.51y$	$-0.14z$	$= -0.036$	−0.026
C.	.658	+ .003	.661	1.0	1.65	0.12	$= -.027$	− .016
C.	.689	+ .002	.691	1.0	1.66	0.11	$= +.003$	+ .014
C.	.702	+ .001	.703	1.0	1.69	0.02	$= +.015$	+ .027
C.	32.699	−0.003	32.696	$+1.0x$	$-1.79y$	$+3.45z$	$= +0.008$	+0.016
C.	.665	− .001	.664	1.0	1.79	3.45	$= -.024$	− .016
Assumed Mean Difference :			32.688					

Normals :

			R
$+10.00x$	$-4.27y$	$+4.28z$	$= +0.000$
-4.27	$+29.98$	-8.97	$= -0.150$
$+4.28$	-8.97	$+25.09$	$= -0.082$

Solution :

	R	R	
x	$= -0.0005$	± 0.0043	Wt. 8.99
y	$= -0.0067$	± 0.0025	25.98
z	$= -0.0056$	± 0.0028	21.45

$[nn] = 0.00398$ $[vv] = 0.00252$ Prob. Error 1 Eq. $= \pm 0''.162$

$\pi = -0''.085 \pm 0''.032$

ξ Ursae maj.	B. D. +32°, 2132	Mag. 3.7	R. A. 11h 10.4m	Decl. +32° 22′	Pos. Angle.
a	+32°, 2124	7.9	11 7.3	32 24	274°.7
b	+32°, 2137	8.2	11 13.0	32 32	70°.3

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896	Jan.	14	7 44	3–4	16.5	177.372	159.825	—0.155	+0.328	337.370
		29	7 17	3	28	.318	.818	.153	.326	.309
		30	7 30	2	28	.356	.83	.153	.326	.356
1902	Jan.	16	8 42	3–4	22.5	177.185	160.135	+0.001	—0.002	337.319
		23	8 38	3–4	26	.191	.154	.002	.003	.344
		25	7 15	2–3	25	.195	.171	.002	.004	.362
		27	8 1	2–3	23	.187	.155	.002	.004	.340
		30	8 10	3	11.5	.186	.175	.002	.004	.359
	Feb.	3	7 46	2–3	14.5	.178	.148	.002	.005	.323
1902	May	31	15 17	3	52	177.136	160.202	+0.011	—0.023	337.326
	June	1	15 18	3	55.5	.168	.190	.011	.023	.346
		8	15 24	3–4	52.5	.158	.191	.011	.024	.336
		9	15 16	2–3	51.5	.156	.201	.011	.024	.344
		12	15 48	2	64	.153	.193	.011	.024	.333
		17	14 52	2	59	.171	.188	.012	.025	.346
			Assumed Annual Proper Motion and Mean Sum:					—0.026	+0.055	337.340

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	17.547	—0.002	17.062	+1.0 x	+1.37 y	−5.96 z	= +0.044	+0.016
E.	.500	+ .002	.023	1.0	1.10	5.92	+ .005	— .019
E.	.524	— .001	.044	1.0	1.08	5.92	+ .026	+ .002
C.	17.050	+0.001	17.054	+1.0 x	+1.33 y	+0.04 z	= +0.036	+0.015
C.	.037	— .000	.042	1.0	1.20	0.06	+ .024	+ .005
C.	.024	— .001	.029	1.0	1.17	0.07	+ .011	— .008
C.	.032	— .000	.038	1.0	1.13	0.07	+ .020	+ .002
C.	.011	— .001	.016	1.0	1.08	0.08	— .002	— .020
C.	.030	+ .001	.038	1.0	1.02	0.09	+ .020	+ .003
C.	16.934	+0.001	16.969	+1.0 x	−1.70 y	+0.41 z	= −0.049	−0.029
C.	.978	— .000	17.012	1.0	1.71	0.41	— .006	+ .014
C.	.967	+ .000	.002	1.0	1.72	0.43	— .016	+ .004
C.	.955	— .000	16.990	1.0	1.72	0.44	— .028	— .008
C.	.960	+ .000	.995	1.0	1.71	0.44	— .023	— .003
C.	.983	— .000	17.020	1.0	1.70	0.46	+ .002	+ .022
	Assumed Mean Difference:		17.018					

Normals:

R				R	R	
+15.00 x	+ 0.22 y	− 14.80 z	= +0.064	*Solution:* x = +0.0031	± 0.0031	Wt. 12.51
+ 0.22	+29.87	− 25.02	= +0.428	y = +0.0135	± 0.0022	23.22
−14.80	− 25.02	+106.77	= −0.490	z = −0.0010	± 0.0013	71.59

$[nn] = 0.00944$ $[vv] = 0.00295$ Prob. Error 1 Eq. = ± 0″.134

$\pi = +0''.171 \pm 0''.028$

83 Leonis, pr.	B. D. +3°, 2502	Mag. 7.5	R.A. $11^h\ 19.4^m$	Decl. +3° 48′	Pos. Angle.
a	+4°, 2461	7.3	11 18.2	4 6	314°.8
b	+3°, 2506	8.2	11 21.0	3 35	119°.2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June	11	14 37	2–3	59	118.317	129.141	—0.141	+0.131	247.448
		12	14 49	2–3	74	.314	.122	.141	.131	.426
		13	14 6	–	76	.321	.144	.140	.130	.455
1892	Dec.	15	8 45	2	26.5	118.308	129.179	—0.112	+0.104	247.479
		25	8 26	3	13	.283	.170	.111	.103	.445
1893	Jan.	6	8 33	3–4	10	.301	.165	.111	.102	.457
1895	Nov.	27	8 22	2	26	118.128	129.325	+0.049	—0.046	247.456
		28	8 47	1–2	29.5	.140	.300	.050	.046	.444
	Dec.	17	9 55	3	29	.082	.316	.053	.049	.402
1896	May	4	12 44	2–3	61	118.127	129.334	+0.074	—0.068	247.467
		5	13 5	3	62	.129	.350	.074	.068	.485
	June	4	13 51	1–2	63	.121	.354	.078	.072	.481
			Assumed Annual Proper Motion and Mean Sum :					—0.055	+0.051	247.454

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	10.824	+0.000	11.096	+1.0 x	+1.93 y	−2.56 z	= +0.008	+0.012
C.	.808	+ .001	.081	1.0	1.93	2.56	— .007	— .003
C.	.823	— .000	.093	1.0	1.93	2.55	+ .005	+ .009
C.	10.871	—0.001	11.086	+1.0 x	−1.89 y	−2.05 z	= —0.002	—0.010
C.	.887	+ .000	.101	1.0	1.84	2.02	+ .013	+ .005
C.	.864	— .000	.077	1.0	1.68	1.99	— .011	— .018
C.	11.197	—0.000	11.102	+1.0 x	−1.84 y	+0.90 z	= +0.014	+0.009
C.	.160	+ .000	.064	1.0	1.84	0.91	— .024	— .028
C.	.234	+ .002	.134	1.0	1.88	0.96	+ .046	+ .041
C.	11.207	—0.000	11.065	+1.0 x	+1.59 y	+1.34 z	= —0.023	—0.016
C.	.221	— .001	.078	1.0	1.61	1.34	— .010	— .003
C.	.233	— .001	.082	1.0	1.93	1.42	— .006	+ .002
	Assumed Mean Difference :		11.088					

Normals :

			R
+ 12.00 x	− 0.05 y	− 6.86 z	= + 0.003
− 0.05	+ 40.09	− 1.97	= − 0.124
− 6.86	− 1.97	+ 40.02	= − 0.033

Solution :

	R	R	
x	= − 0.0003	± 0.0041	Wt. 10.82
y	= − 0.0031	± 0.0021	39.98
z	= − 0.0010	± 0.0022	35.99

$[nn] = 0.00398$ $[vv] = 0.00357$ Prob. Error 1 Eq. = $\pm 0''.170$

$\pi = -0''.039 \pm 0''.027$

β Leonis	**B. D. +15°, 2383**	**Mag. 2.0**	**R. A. 11h 41.7m**	**Decl. +15° 23′**	**Pos. Angle.**
a	+15°, 2378	8.0	11 39.4	15 48	307°.6
b	+15°, 2387	8.5	11 45.0	15 16	98°.3

Date.		Sid. Time. h. m.	Def.	Temp. c	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June 10	15 9	3–4	55	197.660	228.673	−0.079	+0.079	426.333
	11	15 21	2–3	58.5	.653	.674	.079	.079	.327
	12	15 30	2–3	73	.636	.680	.079	.079	.316
1892	Dec. 26	8 47	3–4	10	197.631	228.688	−0.063	+0.063	426.319
1893	Jan. 8	8 38	2	5	.609	.668	.061	.061	.277
	16	8 38	2–3	2	.610	.670	.061	.061	.280
1895	Nov. 27	9 4	2	26	197.549	228.726	+0.028	−0.028	426.275
	Dec. 17	8 46	3	29	.535	.718	.030	.030	.253
1896	Jan. 11	10 17	–	13.5	.524	.780	.032	.032	.304
	Feb. 22	10 8	2–3	23.5	.515	.755	.035	.035	.270
1896	May 5	14 11	3	59.5	197.536	228.796	+0.042	−0.042	426.332
	June 4	14 25	1–2	63	.502	.829	.044	.044	.331
	20	14 46	1–2	74	.521	.844	.046	.046	.365
					Assumed Annual Proper Motion and Mean Sum:		−0.031	+0.031	426.309

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	31.013	−0.002	31.169	$+1.0\,x$	$+1.96\,y$	$-2.56\,z$	$= -0.014$	−0.028
C.	.021	− .001	.178	1.0	1.95	2.56	− .005	− .019
C.	.044	− .001	.201	1.0	1.95	2.56	+ .018	+ .004
C.	31.057	−0.001	31.182	$+1.0\,x$	$-1.82\,y$	$-2.02\,z$	$= -0.001$	+0.021
C.	.059	+ .002	.183	1.0	1.64	1.98	+ .000	+ .020
C.	.060	+ .002	.184	1.0	1.51	1.96	+ .001	+ .020
C.	31.177	+0.002	31.123	$+1.0\,x$	$-1.84\,y$	$+0.90\,z$	$= -0.060$	−0.041
C.	.183	+ .004	.127	1.0	1.88	0.96	− .056	− .036
C.	.256	+ .000	.192	1.0	1.60	1.03	+ .009	+ .026
C.	.240	+ .003	.173	1.0	0.55	1.14	− .010	− .004
C.	31.260	−0.002	31.174	$+1.0\,x$	$+1.59\,y$	$+1.34\,z$	$= -0.009$	−0.023
C.	.327	− .002	.237	1.0	1.95	1.42	+ .054	+ .036
C.	.323	− .004	.227	1.0	1.92	1.47	+ .044	+ .026
	Assumed Mean Difference:		31.183					

Normals:

			R	
$+13.00\,x$	$+0.48\,y$	$-5.38\,z$	$= -0.029$	
$+0.48$	$+39.54$	-3.11	$= +0.380$	
-5.38	-3.11	$+41.56$	$= +0.023$	

Solution:

	R	R	
$x =$	-0.0022	± 0.0056	Wt. 12.31
$y =$	$+0.0097$	± 0.0032	39.31
$z =$	$+0.0010$	± 0.0032	39.12

$[nn] = 0.01241$ $[vv] = 0.00861$ Prob. Error 1 Eq. $= \pm 0''.251$

$\pi = +0''.122 \pm 0''.040$

β Virginis	**B. D. +2°, 2489**	**Mag. 3.3**	**R. A. $11^h\ 43.1^m$**	**Decl. +2° 36′**	**Pos. Angle.**
a	+2°, 2481	8.4	11 40.0	2 50	286°.7
b	+2°, 2493	8.5	11 47.6	2 7	112°.2

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 June 13	15 1	2–3	75.5	235.161	341.897	+0.153	−0.188	577.023
15	15 7	3	62	.155	.869	.153	.188	576.989
21	15 16	3	75.5	.168	.852	.152	.187	.985
1892 Dec. 25	9 48	3	11	235.281	341.875	+0.121	−0.150	577.127
1893 Jan. 6	9 11	3–4	8.5	.230	.814	.120	.147	.017
16	9 35	2–3	2	.198	.780	.118	.145	576.951
1895 Nov. 28	9 30	1–2	29	235.397	341.585	−0.055	+0.067	576.994
1896 Jan. 11	11 0	–	12.5	.376	.594	.062	.076	.984
Feb. 14	10 53	3	23.5	.364	.562	.067	.083	.942
1896 May 4	13 24	2–3	61	235.416	341.598	−0.080	+0.099	577.033
5	13 37	3	60.5	.429	.598	.080	.099	.046
June 5	15 2	2	65.5	.460	.615	.085	.105	.095
Assumed Annual Proper Motion and Mean Sum:						+0.060	−0.074	577.016

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	106.736	−0.002	106.393	$+1.0\,x$	$+2.02\,y$	$-2.55\,z$	$= +0.048$	+0.029
C.	.714	+ .005	.378	1.0	2.01	2.55	+ .033	+ .014
C.	.684	+ .005	.350	1.0	2.00	2.53	+ .005	− .013
C.	106.594	−0.021	106.302	$+1.0\,x$	$-1.93\,y$	$-2.02\,z$	$= -0.043$	−0.027
C.	.584	− .001	.316	1.0	1.82	1.99	− .029	− .014
C.	.582	+ .012	.331	1.0	1.68	1.96	− .014	+ .000
C.	106.188	+0.004	106.314	$+1.0\,x$	$-1.87\,y$	$+0.91\,z$	$= -0.031$	−0.013
C.	.218	+ .006	.362	1.0	1.75	1.03	+ .017	+ .034
C.	.198	+ .014	.362	1.0	0.96	1.12	+ .017	+ .028
C.	106.182	−0.003	106.358	$+1.0\,x$	$+1.53\,y$	$+1.34\,z$	$= +0.013$	+0.002
C.	.169	− .005	.343	1.0	1.56	1.34	− .002	− .013
C.	.155	− .015	.330	1.0	1.99	1.42	− .015	− .030
Assumed Mean Difference:			106.345					

Normals:

$$+12.00\,x + 1.10\,y - 6.44\,z = -0.001\ (R)$$
$$+1.10\,x + 38.18\,y - 2.14\,z = +0.332$$
$$-6.44\,x - 2.14\,y + 40.04\,z = -0.046$$

Solution:

$x = -0.0013\ (R) \pm 0.0049\ (R)$ Wt. 10.95
$y = +0.0087 \pm 0.0027$ 38.02
$z = -0.0009 \pm 0.0027$ 36.52

$[nn] = 0.00824$ $[vv] = 0.00532$ Prob. Error 1 Eq. $= \pm 0''.208$

$\pi = +0''.110 \pm 0''.034$

Lal. 22908	B. D. +11°, 2439	Mag. 8.0	R. A. 12^h 5.8^m	Decl. +11° 39′	Pos. Angle.
a	+12°, 2428	8.0	12 1.9	12 6	295°.0
b	+11°, 2442	8.3	12 8.3	11 40	87°.4

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June 15	16	4	3	61	302.415	173.592	+0.043	−0.010	476.040
	20	15	43	2	73	.410	.616	.043	.010	.059
	22	15	10	2–3	72	.418	.606	.043	.010	.057
1893	Jan. 8	9	25	2	5	302.425	173.586	+0.034	−0.008	476.037
	17	8	27	3	3	.428	.580	.033	.008	.033
	19	8	52	–	13.5	.397	.567	.033	.008	475.989
1896	Jan. 29	10	3	–	25.5	302.476	173.588	−0.018	+0.004	476.050
	Feb. 22	10	43	2–3	24	.452	.540	.019	.005	475.978
1896	May 5	14	43	3	58.5	302.488	173.582	−0.023	+0.005	476.052
	June 5	13	45	2	67	.506	.596	.024	.006	.084
	20	15	15	1–2	73	.472	.585	.025	.006	.038
						Assumed Annual Proper Motion and Mean Sum:		+0.017	−0.004	476.038

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	128.823	−0.001	128.875	$+1.0\,x$	$-1.93\,y$	$-2.55\,z$ =	+0.002	+0.015
C.	.794	− .006	.841	1.0	1.95	2.53	− .032	− .019
C.	.812	− .005	.860	1.0	1.95	2.53	− .013	+ .000
C.	128.839	+0.000	128.881	$+1.0\,x$	$+1.75\,y$	$-1.98\,z$ =	+0.008	−0.003
C.	.848	+ .001	.890	1.0	1.63	1.96	+ .017	+ .006
C.	.830	+ .013	.884	1.0	1.60	1.95	+ .011	+ .001
C.	128.888	−0.003	128.863	$+1.0\,x$	$+1.43\,y$	$+1.08\,z$ =	−0.010	−0.023
C.	.912	+ .016	.904	1.0	0.78	1.14	+ .031	+ .022
C.	128.906	−0.004	128.874	$+1.0\,x$	$-1.37\,y$	$+1.34\,z$ =	+0.001	+0.006
C.	.910	− .012	.868	1.0	1.86	1.42	− .005	+ .003
C.	.887	+ .000	.856	1.0	1.95	1.46	− .017	− .009
	Assumed Mean Difference:		128.873					

Normals:

$$+11.00\,x - 3.82\,y - 7.06\,z = -0.007$$
$$-3.82\,x + 31.39\,y + 0.11\,z = +0.194$$
$$-7.06\,x + 0.11\,y + 39.28\,z = +0.032$$

Solution:

	R	R	
x =	+0.0024	± 0.0033	Wt. 9.28
y =	+0.0065	± 0.0018	29.91
z =	+0.0012	± 0.0017	34.57

$[nn] = 0.00304$ $[vv] = 0.00176$ Prob. Error 1 Eq. = ± 0″.127

$$\pi = +0''.082 \pm 0''.023$$

8 Canum Ven.	B. D. +42°, 2321	Mag. 4.5	R. A. $12^h\ 26.9^m$	Decl. +42° 8′	Pos. Angle.
a	+42°, 2307	6.5	12 20.5	42 10	270°.3
b	+41°, 2312	7.0	12 31.8	41 40	117°.2

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1896	Jan.	14	8	22	3	15.5	335.491	295.661	−0.298	+0.387	631.241
		29	7	59	3	28	.421	.683	.296	.385	.193
		30	8	2	2	28	.438	.659	.296	.385	.186
1902	Jan.	16	9	22	3–4	21.5	335.143	296.055	+0.002	−0.003	631.197
		23	9	26	3–4	24.5	.163	.051	.003	.004	.213
		25	8	5	2–3	25	.128	.036	.003	.005	.162
		27	8	48	2–3	23	.149	.057	.004	.005	.205
		30	9	0	3	10.5	.163	.055	.004	.005	.217
	Feb.	3	8	39	2–3	14	.134	.047	.005	.006	.180
1902	May	31	15	57	3	51	335.107	296.070	+0.020	−0.027	631.170
	June	1	16	3	3	54	.130	.090	.021	.027	.213
		8	16	21	3–4	51.5	.149	.100	.022	.028	.245
		9	15	53	2–3	51	.108	.099	.022	.029	.200
		12	16	30	2	64	.119	.077	.022	.029	.189
		17	15	51	3–4	57	.098	.084	.023	.030	.175
									−0.050	+0.065	631.196

Assumed Annual Proper Motion and Mean Sum: −0.050 +0.065 631.196

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	39.830	−0.003	39.142	$+1.0\,x$	$+1.70\,y$	$-5.96\,z$	$= +0.048$	+0.042
E.	.738	+ .000	.057	1.0	1.63	5.92	− .037	− .043
E.	.779	+ .001	.099	1.0	1.61	5.92	+ .005	− .001
C.	39.088	−0.000	39.093	$+1.0\,x$	$+1.66\,y$	$+0.04\,z$	$= -0.001$	−0.013
C.	.112	− .001	.118	1.0	1.57	0.06	+ .024	+ .012
C.	.092	+ .002	.102	1.0	1.53	0.07	+ .008	− .003
C.	.092	− .001	.100	1.0	1.49	0.07	+ .006	− .005
C.	.108	− .001	.116	1.0	1.43	0.08	+ .022	+ .011
C.	.087	+ .001	.099	1.0	1.37	0.09	+ .005	− .005
C.	39.037	+0.002	39.086	$+1.0\,x$	$-1.77\,y$	$+0.41\,z$	$= -0.008$	+0.003
C.	.040	− .001	.087	1.0	1.78	0.41	− .007	+ .004
C.	.049	− .003	.096	1.0	1.86	0.43	+ .002	+ .014
C.	.009	− .000	.060	1.0	1.86	0.44	− .034	− .022
C.	.042	+ .001	.094	1.0	1.88	0.44	+ .000	+ .012
C.	.014	+ .002	.069	1.0	1.90	0.46	− .025	− .013

Assumed Mean Difference: 39.094

Normals:

$$+15.00\,x + 2.94\,y - 14.80\,z = +0.008$$
$$+2.94\,x + 42.20\,y - 33.43\,z = +0.258$$
$$-14.80\,x - 33.43\,y + 106.77\,z = -0.119$$

Solution:

	R	R	
$x =$	+0.0003	±0.0038	Wt. 12.87
$y =$	+0.0070	±0.0024	31.54
$z =$	+0.0011	±0.0016	69.82

$[nn] = 0.00678$ $[vv] = 0.00511$ Prob. Error 1 Eq. $= \pm 0.''175$

$$\pi = +0.''089 \pm 0.''031$$

33 Virginis	B. D. +10°, 2468	Mag. 6.4	R. A. $12^h\ 39.0^m$	Decl. +10° 22′	Pos. Angle.
a	+10°, 2461	8.1	12 36.0	10 54	306°.1
b	+ 9°, 2675	8.2	12 41.0	9 54	132°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June	20	16	26	2	72	265.537	187.437	+0.084	—0.104	452.954
		21	15	55	3	75	.537	.482	.084	.104	.999
		22	15	48	2–3	70.5	.546	.542	.083	.104	453.067
1893	Jan.	17	9	5	3	2.5	265.523	187.466	+0.066	—0.080	452.975
		19	9	40	–	14	.540	.498	.065	.080	453.023
		20	9	8	2	3	.539	.479	.065	.080	.003
1896	Jan.	29	9	23	3	25.5	265.623	187.347	—0.036	+0.044	452.978
	Feb.	14	11	34	3	23.5	.629	.330	.037	.046	.968
		22	11	16	2–3	24.5	.631	.350	.038	.047	.990
1896	June	4	15	3	1–2	63	265.694	187.314	—0.047	+0.058	453.019
		5	14	25	2–3	66	.662	.361	.047	.058	.034
		20	15	42	1–2	73	.677	.336	.048	.060	.025
							Assumed Annual Proper Motion and Mean Sum:		+0.033	—0.041	453.003

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	78.100	+0.008	78.296	$+1.0\,x$	$-1.94\,y$	$-2.54\,z$	$= +0.077$	+0.058
C.	.055	+ .001	.244	1.0	1.94	2.53	+ .025	+ .006
C.	.004	— .011	.180	1.0	1.94	2.53	— .039	— .058
C.	78.057	+0.005	78.208	$+1.0\,x$	$+1.68\,y$	$-1.96\,z$	$= -0.011$	+0.006
C.	.042	— .003	.184	1.0	1.65	1.95	— .035	— .018
C.	.060	+ .000	.205	1.0	1.63	1.95	— .014	+ .003
C.	78.276	+0.004	78.200	$+1.0\,x$	$+1.48\,y$	$+1.08\,z$	$= -0.019$	—0.000
C.	.299	+ .006	.222	1.0	1.10	1.12	+ .003	+ .018
C.	.281	+ .002	.198	1.0	0.84	1.14	— .021	— .008
C.	78.380	—0.003	78.272	$+1.0\,x$	$-1.87\,y$	$+1.42\,z$	$= +0.053$	+0.039
C.	.301	— .006	.190	1.0	1.88	1.42	— .029	— .043
C.	.341	— .004	.229	1.0	1.94	1.46	+ .010	— .004
	Assumed Mean Difference:		78.219					

R

Normals: $+12.00\,x - 3.13\,y - 5.82\,z = +0.000$

$-3.13 + 34.38 + 0.69 = -0.327$

$-5.82 + 0.69 + 40.58 = -0.035$

R R

Solution: $x = -0.0031 \pm 0.0071$ Wt. 10.90

$y = -0.0098 \pm 0.0041$ 33.57

$z = -0.0011 \pm 0.0038$ 37.72

$[nn] = 0.01418$ $[vv] = 0.01100$ Prob. Error 1 Eq. $= \pm 0''.299$

$\pi = -0''.124 \pm 0''.051$

Lal. 23917	B. D. + 2°, 2585	Mag. 8.2	R. A. 12^h 42.4^m	Decl. +2° 1′	Pos. Angle.
a	+ 3°, 2695	7.8	12 38.8	3 15	325°.3
b	+ 0°, 3002	7.3	12 48.2	0 51	128°.1

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July	7	15	56	2–3	63	434.954	530.498	+0.088	−0.078	965.462
		10	16	7	2–3	70.5	.965	.511	.088	.078	.486
		14	16	24	2–3	73.5	.948	.497	.088	.078	.455
1893	Jan.	20	9	45	1–2	3.5	434.996	530.523	+0.069	−0.061	965.527
		21	9	16	3	8	.990	.500	.069	.061	.498
	Feb.	4	10	27	2–3	2.5	.932	.395	.068	.060	.335
1897	Jan.	10	10	32	3	27.5	435.071	530.336	−0.072	+0.064	965.399
		29	10	34	3–4	14.5	.133	.333	.074	.065	.457
		31	9	58	3–4	13.5	.119	.359	.074	.065	.469
1898	June	21	15	22	–	58	435.165	530.308	−0.123	+0.109	965.459
		23	15	6	3	59.5	.165	.315	.123	.109	.466
	July	1	15	48	2–3	76	.189	.332	.124	.110	.507
								Assumed Annual Proper Motion and Mean Sum:	+0.035	−0.031	965.460

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	95.544	−0.000	95.378	$+1.0x$	$+1.82y$	$-2.49z$ =	+0.002	+0.000
C.	.546	− .003	.377	1.0	1.81	2.48	+ .001	− .001
C.	.549	+ .001	.384	1.0	1.78	2.47	+ .008	+ .006
C.	95.527	−0.007	95.390	$+1.0x$	$-1.61y$	$-1.95z$ =	+0.014	+0.016
C.	.510	− .004	.376	1.0	1.60	1.94	+ .000	+ .002
C.	.463	+ .013	.348	1.0	1.38	1.91	− .028	− .026
C.	95.265	+0.006	95.407	$+1.0x$	$-1.71y$	$+2.02z$ =	+0.031	+0.034
C.	.200	+ .000	.339	1.0	1.48	2.08	− .037	− .034
C.	.240	− .001	.378	1.0	1.44	2.08	+ .002	+ .005
C.	95.143	+0.000	95.375	$+1.0x$	$+1.82y$	$+3.47z$ =	−0.001	− .002
C.	.150	− .001	.381	1.0	1.82	3.47	+ .005	+ .004
C.	.143	− .005	.372	1.0	1.83	3.50	− .004	− .005
	Assumed Mean Difference:		95.376					

Normals:

			R	
+ 12.00 x	+ 1.66 y	+ 3.38 z	= − 0.007	
+ 1.66	+ 33.96	+ 4.97	= + 0.036	
+ 3.38	+ 4.97	+ 78.73	= − 0.011	

Solution:

	R	R	
x =	− 0.0008	± 0.0038	Wt. 11.80
y =	+ 0.0011	± 0.0023	33.47
z =	− 0.0002	± 0.0015	77.18

$[nn] = 0.00342$ $[vv] = 0.00337$ Prob. Error 1 Eq. = ± 0″.166

$\pi = + 0''.014 \pm 0''.029$

δ Virginis	B. D. +4°, 2669	Mag. 3.0	R. A. 12h 48.3m	Decl. +4° 11′	Pos. Angle.
a	+3°, 2703	7.2	12 44.2	3 51	251°.3
b	+4°, 2683	8.0	12 53.1	4 23	80°.6

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Dec.	18	10	34	3–4	26.5	302.051	348.618	—0.002	+0.001	650.668
		23	10	6	3	13	.052	.620	.001	.001	.672
		28	10	40	3	13.5	.039	.620	.000	.000	.659
1903	July	15	16	29	2–3	57	302.064	348.658	+0.021	—0.020	650.723
		16	15	58	3	63.5	.036	.648	.021	.020	.685
		17	16	17	2–3	64.5	.029	.659	.021	.020	.689
		21	16	13	3	65.5	.059	.660	.021	.020	.720
		23	16	17	3	69.5	.038	.646	.021	.020	.685
		25	16	21	2–3	70.5	.057	.659	.022	.021	.717
1904	Jan.	10	9	30	3–4	14	302.007	348.667	+0.040	—0.038	650.676
		11	9	49	3–4	24	.000	.657	.040	.038	.659
		14	9	51	2	21.5	.012	.651	.040	.038	.665
							Assumed Annual Proper Motion and Mean Sum:		—0.039	+0.037	650.685

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	46.567	+0.001	46.571	+1.0 x	−1.49 y	−0.04 z	= +0.001	—0.004
C.	.568	+ .001	.571	1.0	1.52	0.03	+ .001	— .004
C.	.581	+ .002	.583	1.0	1.54	0.01	+ .013	+ .008
C.	46.594	—0.003	46.550	+1.0 x	+1.61 y	+0.53 z	= —0.020	—0.015
C.	.612	+ .000	.571	1.0	1.61	0.54	+ .001	+ .006
C.	.630	— .000	.589	1.0	1.61	0.54	+ .019	+ .024
C.	.601	— .002	.558	1.0	1.59	0.55	— .012	— .007
C.	.608	+ .000	.567	1.0	1.57	0.55	— .003	+ .002
C.	.602	— .002	.557	1.0	1.56	0.56	— .013	— .008
C.	46.660	+0.001	46.583	+1.0 x	−1.56 y	+1.02 z	= +0.013	+0.008
C.	.657	+ .002	.581	1.0	1.56	1.03	+ .011	+ .006
C.	.639	+ .001	.562	1.0	1.56	1.04	— .008	— .013
	Assumed Mean Difference:		46.570					

Normals:

$$+12.00\,x + 0.32\,y + 6.28\,z = +0.^{R}003$$
$$+0.32\,x + 29.38\,y + 0.50\,z = -0.092$$
$$+6.28\,x + 0.50\,y + 4.95\,z = +0.001$$

Solution:

$$x = +0.^{R}0000 \pm 0.^{R}0041 \quad \text{Wt. } 4.04$$
$$y = -0.0031 \pm 0.0015 \quad 29.30$$
$$z = +0.0006 \pm 0.0063 \quad 1.66$$

$[nn] = 0.00161$ $[vv] = 0.00135$ Prob. Error 1 Eq. $= \pm 0.''104$

$$\pi = -0.''039 \pm 0.''019$$

Lal. 24414–6	B. D. +6°, 2697	Mag. 6.8	R. A. 13^h 1.5^m	Decl. +6° 1′	Pos. Angle.
a	+5°, 2710	8.6	12 56.8	5 58	268°.3
b	+5°, 2725	8.7	13 5.7	5 54	95°.1

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July	7	16	29	2–3	62.5	336.223	298.279	+0.010	−0.037	634.475
		10	16	43	2–3	69.5	.221	.260	.010	.037	.454
		15	16	36	–	70.5	.218	.320	.010	.037	.511
1893	Jan.	21	9	57	3	7.5	336.222	298.274	+0.008	−0.029	634.475
	Feb.	3	10	8	3–4	23	.168	.295	.008	.029	.442
		5	10	15	2	8.5	.217	.251	.008	.029	.447
1897	Jan.	10	11	44	3	27.5	336.216	298.161	−0.008	+0.030	634.399
		29	11	57	3–4	16.5	.232	.220	.008	.031	.475
		31	11	18	3–4	12.5	.225	.241	.008	.031	.489
1898	June	23	15	36	3	60	336.230	298.203	−0.014	+0.052	634.471
		30	15	43	2–3	71	.243	.211	.014	.052	.492
	July	5	16	7	2	65.5	.248	.200	.014	.052	.486
							Assumed Annual Proper Motion and Mean Sum :		+0.004	−0.015	634.468

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	37.944	−0.000	37.991	$+1.0\,x$	$-1.87\,y$	$-2.49\,z$	$= +0.017$	+0.015
C.	.961	+ .001	38.009	1.0	1.87	2.48	+ .035	+ .033
C.	.898	− .002	37.943	1.0	1.88	2.47	− .031	− .033
C.	37.948	−0.000	37.985	$+1.0\,x$	$+1.75\,y$	$-1.95\,z$	$= +0.011$	+0.011
C.	.873	+ .001	.911	1.0	1.61	1.91	− .063	− .063
C.	.966	+ .001	38.004	1.0	1.59	1.91	+ .030	+ .030
C.	38.055	+0.004	38.021	$+1.0\,x$	$+1.82\,y$	$+2.02\,z$	$= +0.047$	+0.047
C.	.012	− .000	37.973	1.0	1.67	2.08	− .001	− .001
C.	37.984	− .001	.944	1.0	1.65	2.08	− .030	− .030
C.	38.027	−0.000	37.961	$+1.0\,x$	$-1.83\,y$	$+3.47\,z$	$= -0.013$	−0.013
C.	.032	− .001	.965	1.0	1.85	3.49	− .009	− .009
C.	.048	− .001	.981	1.0	1.86	3.51	+ .007	+ .007
	Assumed Mean Difference :		37.974					

Normals :

			R
$+12.00\,x$	$-1.07\,y$	$+3.44\,z$	$= +0.000$
-1.07	$+37.76$	-4.35	$= -0.010$
$+3.44$	-4.35	$+78.83$	$= -0.030$

Solution :

	R	R	
$x =$	$+0.0001$	± 0.0068	Wt. 11.83
$y =$	-0.0003	± 0.0038	37.45
$z =$	-0.0004	± 0.0027	77.41

$[nn] = 0.01087$ $[vv] = 0.01086$ Prob. Error 1 Eq. $= \pm 0''.297$

$\pi = -0''.004 \pm 0''.048$

Lal. 24504	B. D. +10°, 2519	Mag. 8.5	R. A. $13^h\ 4.2^m$	Decl. +10° 24′	Pos. Angle.
a	+10°, 2513	8.6	13 1.2	10 24	271°.2
b	+10°, 2523	8.6	13 6.8	10 32	76°.8

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July	12	16	45	3	72	209.278	189.708	−0.106	+0.089	398.969
		14	17	8	2–3	73	.290	.666	.106	.089	.939
		16	16	33	–	60.5	.299	.711	.106	.089	.993
1893	Feb.	4	11	5	2–3	2.5	209.263	189.727	−0.082	+0.069	398.977
		5	9	41	2	9	.285	.720	.082	.069	.992
1897	Jan.	10	11	7	3	27.5	209.087	189.846	+0.087	−0.073	398.947
		29	11	22	3	15.5	.115	.817	.089	.075	.946
		31	10	36	3–4	13	.060	.882	.089	.075	.956
1898	June	21	15	55	–	58	209.030	189.908	+0.149	−0.125	398.962
		30	16	13	2–3	69.5	.064	.953	.150	.126	399.041
	July	1	16	25	2	75	.063	.938	.150	.126	.025
							Assumed Annual Proper Motion and Mean Sum:		−0.043	+0.036	398.977

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	19.570	+0.000	19.375	$+1.0\,x$	$-1.76\,y$	$-2.47\,z$ =	−0.024	−0.023
C.	.624	+ .002	.431	1.0	1.76	2.47	+ .032	+ .033
C.	.588	− .001	.392	1.0	1.77	2.46	− .007	− .006
C.	19.536	−0.000	19.385	$+1.0\,x$	$+1.52\,y$	$-1.91\,z$ =	−0.014	−0.018
C.	.565	− .001	.413	1.0	1.51	1.91	+ .014	+ .010
C.	19.241	+0.002	19.403	$+1.0\,x$	$+1.70\,y$	$+2.02\,z$ =	+0.004	+0.002
C.	.298	+ .002	.464	1.0	1.59	2.08	+ .065	+ .063
C.	.178	+ .001	.343	1.0	1.57	2.08	− .056	− .058
C.	19.122	+0.001	19.397	$+1.0\,x$	$-1.65\,y$	$+3.47\,z$ =	−0.002	+0.002
C.	.111	− .003	.384	1.0	1.71	3.49	− .015	− .011
C.	.125	− .002	.399	1.0	1.72	3.50	+ .000	+ .004
	Assumed Mean Difference:		19.399					

Normals:

$$+11.00\,x - 2.48\,y + 5.42\,z = -0.003$$
$$-2.48 + 30.40 - 0.46 = +0.049$$
$$+5.42 - 0.46 + 74.76 = -0.035$$

Solution:

$$x = +0.0004 \pm 0.0072 \quad \text{Wt. } 10.41$$
$$y = +0.0016 \pm 0.0043 \quad 29.84$$
$$z = -0.0005 \pm 0.0027 \quad 72.06$$

$[nn] = 0.00962$ $[vv] = 0.00955$ Prob. Error 1 Eq. = $\pm$ 0.″296

$$\pi = +0.''020 \pm 0.''054$$

43 Comae Berenices	B. D. +28°, 2193	Mag. 5.0	R. A. 13^h 5.1^m	Decl. +28° 37′	Pos. Angle.
a	+28°, 2184	8.4	12 59.9	28 59	287°.6
b	+28°, 2207	8.5	13 11.1	28 12	96°.9

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July	19	17	25	3–4	72	337.980	392.228	—0.125	+0.124	730.207
		21	17	31	2–3	70	.978	.238	.125	.124	.215
		24	17	41	2–3	60	338.044	.162	.124	.123	.205
1895	Jan.	19	9	18	2–3	12.5	337.867	392.274	+0.004	—0.004	730.141
		30	9	31	2–3	15	.852	.311	.007	.007	.163
1897	Feb.	4	10	5	2	16.5	337.679	392.467	+0.180	—0.178	730.148
		13	10	32	3	14	.700	.468	.182	.180	.170
		14	10	6	3	30	.676	.466	.182	.180	.144
1897	July	22	17	16	3	70.5	337.652	392.557	+0.219	—0.217	730.211
		30	16	58	2	65.5	.659	.550	.221	.219	.211
		31	17	24	2–3	69.5	.649	.537	.222	.219	.189
							Assumed Annual Proper Motion and Mean Sum:		—0.086	+0.085	730.180

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	54.248	—0.002	54.495	$+1.0\,x$	$+1.90\,y$	$-1.45\,z$	$= +0.057$	+0.039
C.	.260	— .003	.506	1.0	1.87	1.45	+ .068	+ .050
C.	.118	— .002	.363	1.0	1.83	1.44	— .075	— .092
C.	54.407	+0.003	54.402	$+1.0\,x$	$-1.79\,y$	$+0.05\,z$	$= -0.036$	—0.019
C.	.459	+ .001	.446	1.0	1.63	0.08	+ .008	+ .023
C.	54.788	+0.002	54.432	$+1.0\,x$	$-1.52\,y$	$+2.09\,z$	$= -0.006$	+0.009
C.	.768	+ .001	.407	1.0	1.32	2.12	— .031	— .018
C.	.790	+ .003	.431	1.0	1.29	2.12	— .007	+ .006
C.	54.905	—0.002	54.467	$+1.0\,x$	$+1.86\,y$	$+2.55\,z$	$= +0.029$	+0.013
C.	.891	— .002	.449	1.0	1.74	2.57	+ .011	— .004
C.	.888	— .001	.446	1.0	1.72	2.58	+ .008	— .007
	Assumed Mean Difference:		54.438					

Normals:

			R	
$+11.00\,x$	$+3.36\,y$	$+9.82\,z$	$= +0.026$	
$+3.36$	$+31.51$	-3.40	$= +0.295$	
$+9.82$	-3.40	$+39.39$	$= -0.046$	

Solution:

	R	R	
$x =$	-0.0002	± 0.0100	Wt. 7.98
$y =$	$+0.0093$	± 0.0052	29.15
$z =$	-0.0003	± 0.0052	29.23

$[nn] = 0.01693$ $[vv] = 0.01415$ Prob. Error 1 Eq. $= \pm 0''.359$

$\pi = +0''.118 \pm 0''.066$

174201

Weisse 13^h, 241	B. D. +35°, 2436	Mag. 9.0	R. A. 13^h 12.8^m	Decl. +35° 54′	Pos. Angle.
a	+36°, 2352	6.8	13 8.4	36 12	289°.6
b	+35°, 2445	7.8	13 17.6	35 26	115°.2

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July	20	18	1	2	64	267.373	301.630	+0.070	−0.081	568.992
		24	18	20	2–3	60	.397	.614	.069	.081	.999
		28	17	40	2–3	61.5	.332	.601	.069	.080	.922
1895	Jan.	19	10	3	2–3	12	267.409	301.462	−0.002	+0.003	568.872
		30	8	54	2–3	15	.433	.476	.004	.004	.909
1897	Feb.	4	9	25	2	17	267.538	301.385	−0.100	+0.117	568.940
		13	9	53	3	14	.497	.357	.102	.119	.871
		14	9	28	3	28	.493	.342	.102	.119	.852
1897	July	30	18	0	2	65	267.546	301.404	−0.124	+0.144	568.970
		31	18	0	2–3	69	.579	.385	.124	.144	.982
	Aug.	1	17	18	2–3	69	.569	.361	.124	.145	.951
		2	17	22	2–3	65.5	.585	.371	.124	.145	.977
							Assumed Annual Proper Motion and Mean Sum:		+0.048	−0.056	568.930

Observer.	Difference. K	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	34.257	−0.004	34.102	$+1.0\,x$	$+1.86\,y$	$-1.45\,z$	$= +0.027$	+0.011
C.	.217	− .004	.063	1.0	1.79	1.44	− .012	− .028
C.	.269	+ .000	.120	1.0	1.73	1.43	+ .045	+ .029
C.	34.053	+0.003	34.061	$+1.0\,x$	$-1.76\,y$	$+0.05\,z$	$= -0.014$	−0.007
C.	.043	+ .001	.052	1.0	1.57	0.08	− .023	− .017
C.	33.847	−0.001	34.063	$+1.0\,x$	$-1.46\,y$	$+2.09\,z$	$= -0.012$	−0.001
C.	.860	+ .004	.085	1.0	1.24	2.12	+ .010	+ .020
C.	.849	+ .005	.075	1.0	1.22	2.12	− .000	+ .009
C.	33.858	−0.002	34.124	$+1.0\,x$	$+1.69\,y$	$+2.57\,z$	$= +0.049$	+0.043
C.	.806	− .003	.071	1.0	1.67	2.58	− .004	− .010
C.	.792	− .001	.060	1.0	1.64	2.58	− .015	− .020
C.	.786	− .003	.052	1.0	1.62	2.58	− .023	− .028
	Assumed Mean Difference:		34.075					

Normals:

$$\begin{aligned} +12.00\,x + 4.75\,y + 12.45\,z &= +0.028 \\ +4.75\,x + 31.33\,y + 0.82\,z &= +0.187 \\ +12.45\,x + 0.82\,y + 46.15\,z &= -0.075 \end{aligned}$$

Solution:

	R	R	
$x =$	+0.0026	± 0.0060	Wt. 7.98
$y =$	+0.0056	± 0.0032	28.94
$z =$	−0.0024	± 0.0030	32.67

$[nn] = 0.00704$ $[vv] = 0.00573$ Prob. Error 1 Eq. $= \pm 0''.216$

$\pi = +0''.071 \pm 0''.040$

Weisse 13^h, 216	B. D. +4°, 2729	Mag. 8.5	R. A. 13^h 13.5^m	Decl. +4° 53′	Pos. Angle.
a	+4°, 2712	8.0	13 8.7	4 43	262°.2
b	+5°, 2742	7.7	13 17.4	5 10	74°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Dec. 23	10 57	3	12.5	336.938	288.536	−0.001	+0.001	625.474
	28	11 24	3	13	.900	.491	.000	.000	.391
1903	July 16	16 32	3	63	336.953	288.548	+0.015	−0.010	625.506
	17	16 36	2–3	64	.926	.543	.015	.010	.474
	21	16 47	3	65.5	.911	.541	.015	.010	.457
	24	16 30	3	70	.937	.546	.016	.011	.488
	27	16 40	2	61	.959	.542	.016	.011	.506
1904	Jan. 10	10 8	3–4	13	336.919	288.530	+0.028	−0.019	625.458
	14	10 26	2	21.5	.868	.533	.029	.020	.410
	Feb. 11	11 49	2	5.5	.884	.533	.031	.021	.427
						Assumed Annual Proper Motion and Mean Sum:	−0.028	+0.019	625.459

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	48.402	−0.001	48.399	$+1.0\,x$	$+1.51\,y$	$-0.03\,z$	$= -0.013$	−0.008
C.	.409	+ .005	.414	1.0	1.54	0.01	+ .002	+ .007
C.	48.405	−0.004	48.426	$+1.0\,x$	$-1.69\,y$	$+0.54\,z$	$= +0.014$	+0.009
C.	.383	− .001	.407	1.0	1.69	0.54	− .005	− .010
C.	.370	+ .000	.395	1.0	1.67	0.55	− .017	− .022
C.	.391	− .002	.416	1.0	1.66	0.56	+ .004	− .001
C.	.417	− .004	.440	1.0	1.64	0.57	+ .028	+ .023
C.	48.389	+0.000	48.436	$+1.0\,x$	$+1.60\,y$	$+1.02\,z$	$= +0.024$	+0.027
C.	.335	+ .004	.388	1.0	1.59	1.03	− .024	− .022
C.	.351	+ .002	.405	1.0	1.39	1.11	− .007	− .005
	Assumed Mean Difference:		48.412					

Normals: $+10.00\,x - 0.72\,y + 5.88\,z = +0.006$ (R)
$-0.72 + 25.63 + 0.14 = -0.066$
$+5.88 + 0.14 + 4.84 = +0.006$

Solution: $x = -0.0013 \pm 0.0075$ (R) Wt. 2.84
$y = -0.0026 \pm 0.0025$ (R) 25.36
$z = +0.0029 \pm 0.0107$ (R) 1.38

$[nn] = 0.00268$ $[vv] = 0.00250$ Prob. Error 1 Eq. $= \pm 0''.161$

$\pi = -0''.033 \pm 0''.032$

Lal. 24774	B. D. +43°, 2321	Mag. 8.0	R. A. 13h 14.1m	Decl. +43° 53′	Pos. Angle.
a	+44°, 2264	8.2	13 10.2	44 36	316°.5
b	+42°, 2403	7.2	13 22.8	42 59	119°.4

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July 21	18 6	2	70	285.535	511.038	−0.029	+0.029	796.573
	28	18 18	2–3	61.5	.565	.021	.029	.029	.586
	Aug. 7	17 48	3	66	.577	.060	.028	.028	.637
1895	Jan. 19	10 49	2–3	12	285.518	511.016	+0.001	−0.001	796.534
	30	8 16	2–3	14.5	.526	.043	.002	.002	.569
1897	Feb. 4	8 41	2	18.5	285.491	511.072	+0.042	−0.042	796.563
	13	9 15	3–4	13	.497	.026	.042	.042	.523
	14	8 47	3	26	.480	.082	.042	.042	.562
1897	July 22	18 5	3	70	285.503	511.139	+0.051	−0.051	796.642
	30	18 38	2	64.5	.463	.115	.051	.051	.578
	31	18 41	2–3	68.5	.454	.128	.052	.052	.582
		Assumed Annual Proper Motion and Mean Sum:					−0.020	+0.020	796.575

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	225.503	+0.001	225.562	$+1.0\,x$	$+1.58\,y$	$-1.45\,z$ =	+0.042	+0.024
C.	.456	− .003	.511	1.0	1.43	1.43	− .009	− .025
C.	.483	− .018	.521	1.0	1.16	1.40	+ .001	− .012
C.	225.498	+0.012	225.508	$+1.0\,x$	$-1.52\,y$	$+0.05\,z$ =	−0.012	+0.011
C.	.517	+ .002	.515	1.0	1.27	.008	− .005	+ .015
C.	225.581	+0.003	225.500	$+1.0\,x$	$-1.14\,y$	$+2.09\,z$ =	−0.020	−0.002
C.	.529	+ .015	.460	1.0	0.88	2.12	− .060	− .046
C.	.602	+ .004	.522	1.0	0.84	2.12	+ .002	+ .016
C.	225.636	−0.019	225.515	$+1.0\,x$	$+1.56\,y$	$+2.55\,z$ =	−0.005	−0.024
C.	.652	− .001	.549	1.0	1.38	2.57	+ .029	+ .012
C.	.674	− .002	.568	1.0	1.35	2.58	+ .048	+ .032
	Assumed Mean Difference:		225.520					

Normals: (R)

$+11.00\,x + 2.81\,y + 9.88\,z = +0.011$

$+2.81 + 18.74 - 1.15 = +0.249$

$+9.88 - 1.15 + 39.24 = -0.035$

Solution: (R)

$x = -0.0027 \pm 0.0063$ Wt. 8.00

$y = +0.0137 \pm 0.0043$ 17.58

$z = +0.0002 \pm 0.0033$ 29.59

$[nn] = 0.00919$ $[vv] = 0.00578$ Prob. Error 1 Eq. $= \pm 0''.229$

$\pi = +0''.174 \pm 0''.055$

70 Virginis	B. D. +14°, 2621	Mag. 5.5	R. A. $13^h\ 21.3^m$	Decl. +14° 34′	Pos. Angle.
a	+14°, 2617	8.2	13 20.4	14 40	297°.2

Date.	Sid. Time.	Def.	Temp.	Distance *a*.	P. M. Correction.	Corrected Sums from Lal. 25372 and τ Bootis.		
	h. m.		°	R	R	R	R	R
1892 June 21	17 0	3	74.5	73.848	+0.013			
25	16 25	2–3	63	.866	.013	511.996	+862.870	= 1374.866
July 6	15 54	2–3	62.5	.834	.012			
1893 Feb. 11	9 39	3	29.5	73.862	+0.009			
15	10 34	2–3	31.5	.874	.009	511.977	+862.855	= 1374.832
22	10 20	3	23.5	.858	.009			
1896 Feb. 12	10 25	2–3	20	73.880	−0.006			
27	10 51	2	25	.882	.006	511.943	+862.828	= 1374.771
1898 June 20	16 3	2–3	61	73.887	−0.017			
21	16 20	2–3	57.5	.858	.017	512.035	+862.889	= 1374.924
23	15 58	2–3	60	.884	.017			
Assumed Annual Proper Motion and Mean Sum :					+0.005			1374.856

Observer.	Scale Value Correction.	Corrected Distance.	Equations of Condition.				Residuals.
	R	R				R	R
E.	−0.001	73.860	+1.0 x	−0.98 y	−2.53 z	= −0.010	+0.000
E.	− .001	.878	1.0	0.98	2.52	+ .008	+ .018
E.	− .001	.845	1.0	0.98	2.49	− .025	− .015
E.	+0.001	73.872	+1.0 x	+0.73 y	−1.89 z	= +0.002	−0.006
E.	+ .001	.884	1.0	0.68	1.88	+ .014	+ .007
E.	+ .001	.868	1.0	0.59	1.86	− .002	− .008
E.	+0.004	73.878	+1.0 x	+0.72 y	+1.11 z	= +0.008	+0.002
E.	+ .004	.880	1.0	0.51	1.16	+ .010	+ .006
E.	−0.004	73.866	+1.0 x	−0.98 y	+3.47 z	= −0.004	+0.009
E.	− .004	.837	1.0	0.98	3.47	− .033	− .020
E.	− .004	.863	1.0	0.98	3.48	− .007	+ .006
Assumed Mean Distance :		73.870					

Normals :

			R
+ 11.00 x	− 2.66 y	− 0.48 z	= − 0.039
− 2.66	+ 7.88	− 5.19	= + 0.090
− 0.48	− 5.19	+ 68.28	= − 0.091

Solution :

	R	R	
x =	− 0.0010	± 0.0026	Wt. 10.0
y =	+ 0.0107	± 0.0031	7.2
z =	− 0.0005	± 0.0010	64.4

$[nn] = 0.00230$ $[vv] = 0.00124$ Prob. Error 1 Eq. = ± 0″.106

$\pi = +0''.136 \pm 0''.039$

Lal. 25372	B. D. +15°, 2620	Mag. 8.5	R. A. 13h 38.4m	Decl. +15° 41′	Pos. Angle.
a	+15°, 2609	7.6	13 35.5	15 53	286°.8
b	+15°, 2631	8.3	13 42.9	15 36	92°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June 21	16 36	3	74.5	212.087	299.924	+0.413	−0.420	512.004
	25	16 8	2–3	63	.072	.930	.410	.417	511.995
	July 6	15 38	2–3	62.5	.090	.906	.404	.412	.988
1893	Feb. 11	10 9	3	29	212.154	299.763	+0.308	−0.314	511.911
	15	10 44	2–3	31.5	.223	.818	.306	.312	512.035
	22	10 32	2–3	23.5	.189	.803	.303	.309	511.986
1896	Feb. 12	10 6	2–3	20	212.660	299.253	−0.181	+0.184	511.916
	27	10 39	2	25.5	.707	.260	.189	.193	.971
1898	June 15	15 53	3	56.5	213.069	298.966	−0.562	+0.573	512.046
	20	15 49	2–3	61.5	.088	.986	.566	.576	.084
	23	16 12	2–3	60	.022	.942	.567	.578	511.975
							Assumed Annual Proper Motion and Mean Sum:	+0.163	−0.166	511.992

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	87.837	−0.002	87.002	+1.0 x	+1.80 y	−2.53 z =	+0.002	−0.017
E.	.858	− .001	.030	1.0	1.81	2.52	+ .030	+ .011
E.	.816	+ .001	.001	1.0	1.84	2.49	+ .001	− .019
E.	87.609	+0.014	87.001	+1.0 x	−1.62 y	−1.89 z =	+0.001	+0.028
E.	.595	− .008	86.969	1.0	1.56	1.88	− .031	− .005
E.	.614	+ .001	87.003	1.0	1.41	1.86	+ .003	+ .027
E.	86.593	+0.013	86.971	+1.0 x	−1.60 y	+1.11 z =	−0.029	−0.008
E.	.553	+ .004	.939	1.0	1.30	1.16	− .061	− .044
E.	85.897	−0.009	87.023	+1.0 x	+1.75 y	+3.45 z =	+0.023	−0.006
E.	.898	− .016	.024	1.0	1.79	3.47	+ .024	− .005
E.	.920	+ .003	.068	1.0	1.81	3.48	+ .068	+ .038
			Assumed Mean Difference:	87.000				

Normals:

			R′	
+11.00 x	+ 3.31 y	− 0.50 z	= +0.031	
+ 3.31	+30.72	+10.15	= +0.434	
− 0.50	+10.15	+68.14	= +0.263	

Solution:

	R	R	
x =	−0.0012	± 0.0056	Wt. 10.6
y =	+0.0137	± 0.0034	28.2
z =	+0.0018	± 0.0023	64.5

$[nn] = 0.01216$ $[vv] = 0.00580$ Prob. Error 1 Eq. = ± 0″.230

$\pi = +0''.174 \pm 0''.043$

τ Bootis	B. D. +18°, 2782	Mag. 4.6	R. A. $13^h\ 40.4^m$	Decl. +18° 11′	Pos. Angle.
a	+18°, 2766	8.2	13 33.8	18 32	282°.8
b	+17°, 2676	7.2	13 45.6	17 26	120°.4

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 June 20	17 13	3	71.5	453.048	409.885	−0.121	+0.061	862.873
25	16 50	2–3	61	.074	.890	.121	.061	.904
26	17 33	3	63.5	.021	.872	.121	.060	.832
1893 Feb. 11	10 23	3	28.5	452.994	409.890	−0.091	+0.045	862.838
15	10 56	2–3	31	453.014	.913	.090	.045	.882
22	10 46	3	22	.012	.877	.089	.045	.845
1896 Feb. 12	10 38	2–3	19.5	452.880	409.955	+0.053	−0.027	862.861
27	11 5	2	24.5	.833	.934	.056	.028	.795
1898 June 16	15 48	2–3	56.5	452.791	410.027	+0.166	−0.083	862.901
21	16 34	2–3	56.5	.757	.069	.167	.083	.910
23	16 27	2–3	59.5	.741	.033	.167	.084	.857
Assumed Annual Proper Motion and Mean Sum:						−0.048	+0.024	862.864

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	43.163	−0.000	42.981	$+1.0\,x$	$-1.88\,y$	$-2.53\,z$ =	+0.001	+0.001
E.	.184	− .002	43.000	1.0	1.89	2.52	+ .020	+ .020
E.	.149	+ .002	42.970	1.0	1.92	2.52	− .010	− .010
E.	43.104	+0.001	42.969	$+1.0\,x$	$+1.56\,y$	$-1.89\,z$ =	−0.011	−0.018
E.	.101	− .001	.965	1.0	1.47	1.88	− .015	− .022
E.	.135	+ .001	43.002	1.0	1.32	1.86	+ .022	+ .015
E.	42.925	+0.000	43.005	$+1.0\,x$	$+1.52\,y$	$+1.11\,z$ =	+0.025	+0.022
E.	.899	+ .003	42.986	1.0	1.20	1.16	+ .006	+ .003
E.	42.764	−0.002	43.011	$+1.0\,x$	$-1.86\,y$	$+3.46\,z$ =	+0.031	+0.038
E.	.688	− .002	42.936	1.0	1.89	3.47	− .044	− .037
E.	.708	+ .000	.959	1.0	1.90	3.48	− .021	− .014
Assumed Mean Difference:			42.980					

Normals:

			R
$+11.00\,x$	$-4.27\,y$	$-0.52\,z$ =	−0.004
-4.27	$+31.50$	-10.32 =	+0.079
-0.52	-10.32	$+68.36$ =	−0.104

Solution:

	R	R	
x =	+0.0012	± 0.0052	Wt. 10.4
y =	+0.0023	± 0.0032	28.2
z =	−0.0012	± 0.0021	64.6

$[nn] = 0.00532$ $[vv] = 0.00500$ Prob. Error 1 Eq. = ± 0″.214

$\pi = +0''.029 \pm 0''.040$

Lal. 26289	B. D. +1°, 2920	Mag. 6.5	R. A. 14h 15.9m	Decl. +1° 56′	Pos. Angle.
a	+2°, 2802	8.5	14 12.2	2 18	292°.5
b	+1°, 2933	8.2	14 19.6	1 46	97°.0

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July 17	16	53	3	63	280.397	270.443	+0.076	−0.042	550.874
	24	16	58	2–3	74	.344	.407	.075	.041	.785
	Aug. 5	17	17	2–3	72	.349	.393	.074	.041	.775
1893	Feb. 11	10	41	2–3	29.5	280.351	270.415	+0.059	−0.032	550.793
	15	11	11	2–3	32.5	.389	.387	.058	.032	.802
	22	11	5	3	23	.410	.383	.058	.032	.819
1901	Apr. 1	11	43	–	39	280.620	270.262	−0.194	+0.106	550.794
	12	13	16	–	44	.630	.279	.195	.107	.821
	26	12	51	2–3	45.5	.625	.284	.196	.107	.820
	27	12	40	3–4	47	.643	.291	.196	.107	.845
	28	12	30	2	45	.626	.242	.196	.108	.780
1901	Aug. 9	17	15	3	72	280.650	270.255	−0.205	+0.112	550.812
	11	17	22	2	76.5	.632	.239	.205	.112	.778
	26	17	55	2	72	.643	.239	.206	.113	.789
	28	18	3	–	70	.641	.250	.206	.113	.798
	29	18	2	–	69	.623	.232	.206	.113	.762
							Assumed Annual Proper Motion and Mean Sum:	+0.031	−0.017	550.804

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	9.954	−0.001	10.071	$+1.0x$	$-1.99y$	$-2.45z$	$= +0.011$	−0.003
E.	.937	+ .000	.053	1.0	1.98	2.43	= − .007	− .021
E.	.956	+ .001	.072	1.0	1.93	2.40	= + .012	− .002
E.	9.936	+0.000	10.027	$+1.0x$	$+1.81y$	$-1.89z$	$= -0.033$	−0.041
E.	10.002	+ .000	.092	1.0	1.75	1.88	= + .032	+ .023
E.	.027	− .000	.117	1.0	1.63	1.86	= + .057	+ .048
S.	10.358	+0.000	10.058	$+1.0x$	$+0.70y$	$+6.25z$	$= -0.002$	−0.007
S.	.351	− .000	.049	1.0	0.32	6.28	= − .011	− .017
S.	.341	− .000	.038	1.0	−0.15	6.32	= − .022	− .028
S.	.352	− .001	.048	1.0	0.18	6.32	= − .012	− .018
S.	.384	+ .000	.080	1.0	0.21	6.33	= + .020	+ .014
S.	10.395	−0.000	10.078	$+1.0x$	$-1.90y$	$+6.61z$	$= +0.018$	+0.010
S.	.393	+ .001	.077	1.0	1.89	6.61	= + .017	+ .008
S.	.404	+ .000	.085	1.0	1.70	6.65	= + .025	+ .016
S.	.391	+ .000	.072	1.0	1.66	6.66	= + .012	+ .004
S.	.391	+ .001	.073	1.0	1.64	6.66	= + .013	+ .005

Assumed Mean Difference: 10.060

Normals: $+16.00x - 9.02y + 51.78z = +0.130$ (R)
$-9.02 + 36.77 - 50.76 = -0.096$
$+51.78 - 50.76 + 446.99 = +0.251$

Solution: $x = +0.0096 \pm 0.0049$ (R) Wt. 9.7
$y = -0.0012 \pm 0.0028$ (R) 30.0
$z = -0.0006 \pm 0.0009$ (R) 264.7

$[nn] = 0.00835$ $[vv] = 0.00715$ Prob. Error 1 Eq. $= \pm 0''.192$

$$\pi = -0''.016 \pm 0''.036$$

From Elkin's observations $y = +0.0034 - 0.150z$ (R) Wt. 20.5 Prob. Error 1 Eq. $= \pm 0''.289$
From Smith's observations $y = -0.0114 + 0.176z$ (R) 9.3 Prob. Error 1 Eq. $= \pm 0''.102$

$\pi = +0''.042 \pm 0''.064$ E.
$\pi = -0''.146 \pm 0''.034$ S.

Fed. 2544	B. D. +54°, 1716	Mag. 7.7	R. A. $14^h\ 51.1^m$	Decl. +54° 15′	Pos. Angle.
a	+54°, 1700	7.0	14 38.8	54 25	274°.7
b	+53°, 1761	7.8	15 2.6	53 52	102°.3

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Aug. 3	19	7	2	63.5	505.748	494.254	−0.106	+0.121	1000.017
	5	17	52	–	71	.717	.222	.106	.121	999.954
	7	18	30	3	65.5	.748	.244	.105	.120	1000.007
	11	18	2	2–3	71	.733	.255	.104	.120	.004
1895	Mar. 16	10	51	2–3	19.5	505.582	494.316	+0.015	−0.017	999.896
	18	10	3	2–3	29	.591	.320	.016	.018	.909
	23	9	54	2–3	30.5	.596	.347	.016	.019	.940
1896	Mar. 21	12	4	–	31	505.522	494.442	+0.091	−0.105	999.950
	24	11	21	3–4	17	.504	.419	.091	.105	.909
	27	11	42	1–2	21.5	.510	.418	.092	.106	.914
1897	Aug. 17	19	48	2	61.5	505.447	494.581	+0.196	−0.225	999.999
	18	19	10	3–4	61.5	.431	.558	.197	.226	.960
	25	18	44	3	66	.436	.603	.199	.228	1000.010
							Assumed Annual Proper Motion and Mean Sum:	−0.075	+0.086	999.956

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	11.494	−0.001	11.266	$+1.0\,x$	$-1.95\,y$	$-1.41\,z$ =	−0.015	−0.002
C.	.495	+ .000	.268	1.0	1.95	1.41	+ .013	+ .000
C.	.504	− .001	.278	1.0	1.95	1.40	− .003	+ .010
C.	.478	− .001	.253	1.0	1.93	1.39	− .028	− .015
C.	11.266	+0.001	11.299	$+1.0\,x$	$+1.26\,y$	$+0.20\,z$ =	+0.018	+0.010
C.	.271	+ .001	.306	1.0	1.21	0.21	+ .025	+ .017
C.	.249	+ .000	.284	1.0	1.08	0.22	+ .003	− .004
C.	11.080	+0.000	11.276	$+1.0\,x$	$+1.13\,y$	$+1.22\,z$ =	−0.005	−0.015
C.	.085	+ .001	.282	1.0	1.05	1.22	+ .001	− .008
C.	.092	+ .000	.290	1.0	0.96	1.23	+ .009	− .000
C.	10.866	−0.000	11.287	$+1.0\,x$	$-1.89\,y$	$+2.62\,z$ =	+0.006	+0.009
C.	.873	− .000	.296	1.0	1.88	2.63	+ .015	+ .018
C.	.833	− .001	.259	1.0	1.77	2.65	− .022	− .020
			Assumed Mean Difference:	11.281				

Normals:

$$+13.00\,x - 6.63\,y + 6.59\,z = -0.009$$
$$-6.63\,x + 32.87\,y + 0.91\,z = +0.174$$
$$+6.59\,x + 0.91\,y + 33.30\,z = +0.095$$

Solution:

	R	R	
x =	+0.0007	± 0.0028	Wt. 10.28
y =	+0.0054	± 0.0017	28.87
z =	+0.0026	± 0.0017	29.34

$[nn] = 0.00299$ $[vv] = 0.00180$ Prob. Error 1 Eq. = ± 0″.115

$\pi = +0''.069 \pm 0''.021$

Lal. 27742	B. D. +19°, 2939	Mag. 6.7	R. A. $15^h\ 6.3^m$	Decl. +19° 50′	Pos. Angle.
a	+19°, 2929	8.0	15 2.3	19 37	256.°0
b	+19°, 2945	8.2	15 9.9	19 42	98.°2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1892	July	17	17 55	3	62	270.960	246.000	—0.059	+0.118	517.019
		21	18 0	3	68	.961	.012	.059	.117	.031
	Aug.	5	18 1	2–3	70.5	.938	.004	.058	.115	516.999
1893	March	1	11 48	2–3	26	270.923	246.018	—0.044	+0.088	516.985
		2	12 16	2–3	22	.951	245.969	.044	.088	.964
		4	11 41	3	18	.875	246.038	.044	.088	.957
1901	April	12	12 47	–	44	270.711	246.416	+0.151	—0.302	516.976
		26	12 20	2–3	46	.713	.441	.152	.304	517.002
		27	12 10	3–4	47	.716	.416	.152	.304	516.980
		28	11 54	2	48	.706	.394	.152	.304	.948
1901	Sept.	3	19 25	2	69	270.756	246.462	+0.160	—0.320	517.058
		4	19 5	2–3	71	.703	.473	.160	.321	.015
		5	19 4	2–3	75	.729	.478	.160	.321	.046
		7	19 0	2–3	75.5	.705	.458	.160	.321	.002
		8	18 40	3	61	.704	.423	.160	.321	516.966
								—0.024	+0.048	517.003

Assumed Annual Proper Motion and Mean Sum: —0.024 +0.048 517.003

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	24.960	—0.001	24.782	$+1.0\,x$	$-1.72\,y$	$-2.45\,z$	$= +0.022$	+0.012
E.	.949	— .001	.772	1.0	1.75	2.44	+ .012	+ .003
E.	.934	+ .000	.761	1.0	1.86	2.40	+ .001	— .008
E.	24.905	+0.001	24.774	$+1.0\,x$	$+1.69\,y$	$-1.84\,z$	$= +0.014$	—0.007
E.	.982	+ .002	.852	1.0	1.68	1.84	+ .092	+ .071
E.	.837	+ .002	.707	1.0	1.65	1.83	— .053	— .073
S.	24.295	+0.001	24.749	$+1.0\,x$	$+0.88\,y$	$+6.28\,z$	$= -0.011$	—0.001
S.	.272	+ .000	.728	1.0	0.45	6.32	— .032	— .021
S.	.300	+ .001	.757	1.0	0.42	6.32	— .003	+ .008
S.	.312	+ .003	.771	1.0	0.39	6.32	+ .011	+ .022
S.	24.294	—0.003	24.771	$+1.0\,x$	$-1.74\,y$	$+6.67\,z$	$= +0.011$	+0.029
S.	.230	— .001	.710	1.0	1.73	6.68	— .050	— .032
S.	.251	— .002	.730	1.0	1.72	6.68	— .030	— .012
S.	.247	+ .000	.728	1.0	1.70	6.69	— .032	— .014
S.	.281	+ .002	.764	1.0	1.69	6.69	+ .004	+ .022

Assumed Mean Difference: 24.760

Normals:

$$\begin{array}{rrrcr} +15.00\,x & -6.75\,y & +45.85\,z & = & -0.044 \\ -6.75 & +33.89 & -40.12 & = & +0.176 \\ +45.85 & -40.12 & +410.35 & = & -1.051 \end{array}$$

(R)

Solution:

$$x = +0.0082 \pm 0.0071 \quad \text{Wt. } 10.7$$
$$y = +0.0030 \pm 0.0042 \quad 30.4$$
$$z = -0.0032 \pm 0.0014 \quad 257.9$$

$[nn] = 0.01790$ $[vv] = 0.01429$ Prob. Error 1 Eq. $= \pm 0.''294$

$$\pi = +0.''038 \pm 0.''053$$

From Elkin's observations $y = +0.020 - 0.171\,z$ (R) Wt. 17.8 Prob. Error 1 Eq. $= \pm 0.''442$

From Smith's observations $y = +0.045 + 0.168\,z$ 11.4 Prob. Error 1 Eq. $= \pm 0.153$

$$\pi = +0.''025 \pm 0.''105 \text{ E.}$$
$$\pi = +0.057 \pm 0.045 \text{ S.}$$

5 Serpentis	B. D. +2°, 2944	Mag. 5.0	R. A. 15h 12.0m	Decl. +2° 19′	Pos. Angle.
a	+1°, 3051	8.7	15 8.6	1 43	234°.5
b	+2°, 2952	8.6	15 15.4	2 44	64°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July 17	17 28	3	62.5	293.488	273.263	+0.010	−0.025	566.736
	23	17 30	2–3	73	.508	.263	.010	.024	.757
	26	17 35	2–3	80.5	.474	.248	.010	.024	.708
1893	Mar. 1	12 1	2–3	26	293.470	273.240	+0.007	−0.018	566.699
	4	12 0	3	17.5	.488	.194	.007	.018	.671
1901	Apr. 1	12 24	3	38	293.543	273.151	−0.025	+0.062	566.731
	12	12 13	–	46	.545	.130	.025	.063	.713
	26	13 29	2–3	45	.513	.168	.025	.063	.719
	27	13 11	3–4	45	.526	.115	.025	.063	.679
	28	12 56	2	46	.517	.116	.025	.063	.671
1901	Aug. 28	18 33	2–3	68	293.500	273.154	−0.027	+0.067	566.694
	29	18 33	2–3	68	.508	.142	.027	.067	.690
	Sept. 3	18 28	2	70	.529	.184	.027	.067	.753
	6	18 30	2	76	.498	.147	.027	.067	.685
							+0.004	−0.010	566.708

Assumed Annual Proper Motion and Mean Sum: +0.004 −0.010 566.708

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	20.225	−0.001	20.259	+1.0 x	−1.16 y	−2.45 z	= −0.031	+0.000
E.	.245	− .002	.277	1.0	1.22	2.44	− .013	+ .019
E.	.226	+ .000	.260	1.0	1.25	2.43	− .030	+ .002
E.	20.230	+0.000	20.255	+1.0 x	+1.39 y	−1.84 z	= −0.035	−0.045
E.	.294	+ .001	.320	1.0	1.39	1.83	+ .030	+ .020
S.	20.392	−0.001	20.304	+1.0 x	+1.12 y	+6.25 z	= +0.014	−0.001
S.	.415	− .000	.327	1.0	0.95	6.28	+ .037	+ .025
S.	.345	− .000	.257	1.0	0.65	6.32	− .033	− .040
S.	.411	+ .001	.324	1.0	0.63	6.32	+ .034	+ .027
S.	.401	+ .001	.314	1.0	0.61	6.32	+ .024	+ .018
S.	20.346	+0.001	20.253	+1.0 x	−1.48 y	+6.68 z	= −0.037	−0.011
S.	.366	+ .001	.273	1.0	1.47	6.68	− .017	+ .009
S.	.345	− .002	.249	1.0	1.44	6.70	− .041	− .016
S.	.351	+ .001	.258	1.0	1.43	6.71	− .032	− .007

Assumed Mean Difference: 20.290

Normals:

			R
+14.00 x	− 2.71 y	+ 47.27 z	= −0.130
− 2.71	+20.04	− 10.18	= +0.333
+47.27	−10.18	+402.06	= −0.182

Solution:

	R	R	
x =	−0.0100	± 0.0057	Wt. 8.5
y =	+0.0158	± 0.0037	19.5
z =	−0.0011	± 0.0011	242.5

$[nn] = 0.01292$ $[vv] = 0.00656$ Prob. Error 1 Eq. = ± 0″.208

$\pi = +$ 0″.200 ± 0″.047

R

From Elkin's observations $y = +0.0085 - 0.160\,z$ Wt. 8.1 Prob. Error 1 Eq. = ± 0″.237

From Smith's observations $y = +0.0210 + 0.158\,z$ 11.4 Prob. Error 1 Eq. = ± 0.195

$\pi = +$ 0″.108 ± 0″.086 E.

$\pi = +$ 0.266 ± 0.059 S.

Lal. 27958	B. D. +26°, 2677	Mag. 8.0	R. A. 15h 12.8m	Decl. +26° 14′	Pos. Angle.
a	+26°, 2670	6.8	15 9.4	26 11	266°.5
b	+26°, 2685	7.3	15 16.2	26 9	95°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July 20	18 58	2	63.5	215.899	215.981	−0.067	+0.064	431.877
	21	18 41	2	69.5	.874	.998	.067	.064	.869
	30	19 53	–	65	.907	.989	.066	.063	.893
1895	Mar. 16	12 12	2	19.5	215.802	216.025	+0.009	−0.009	431.827
	18	10 43	2–3	29	.782	.039	.010	.009	.822
	23	10 25	2–3	30	.805	.037	.010	.010	.842
1896	Mar. 21	12 45	–	31	215.750	216.083	+0.056	−0.054	431.835
	24	11 53	3–4	17	.763	.097	.056	.054	.862
	27	12 8	1–2	21.5	.760	.091	.057	.054	.854
1897	Aug. 17	18 18	2–3	62.5	215.694	216.144	+0.120	−0.115	431.843
	18	19 44	3–4	61	.703	.179	.121	.116	.887
	25	19 17	3	66	.701	.121	.122	.116	.828
	26	19 0	2	62.5	.688	.181	.122	.117	.874
					Assumed Annual Proper Motion and Mean Sum :		−0.046	+0.044	431.854

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	0.082	−0.000	0.213	$+1.0\,x$	$+1.80\,y$	$-1.45\,z$	$= -0.009$	−0.013
C.	.124	− .000	.255	1.0	1.81	1.45	+ .033	+ .029
C.	.082	− .000	.211	1.0	1.89	1.43	− .011	− .015
C.	0.223	+0.000	0.205	$+1.0\,x$	$-1.55\,y$	$+0.20\,z$	$= -0.017$	−0.016
C.	.257	+ .000	.238	1.0	1.51	0.21	+ .016	+ .017
C.	.232	+ .000	.212	1.0	1.40	0.22	− .010	− .009
C.	0.333	+0.000	0.223	$+1.0\,x$	$-1.46\,y$	$+1.22\,z$	$= +0.001$	+0.003
C.	.334	− .000	.224	1.0	1.39	1.23	+ .002	+ .004
C.	.331	+ .000	.220	1.0	1.30	1.23	− .002	− .000
C.	0.450	+0.000	0.215	$+1.0\,x$	$+1.93\,y$	$+2.62\,z$	$= -0.007$	−0.008
C.	.476	− .000	.239	1.0	1.93	2.63	+ .017	+ .016
C.	.420	+ .000	.182	1.0	1.88	2.65	− .040	− .041
C.	.493	− .000	.254	1.0	1.88	2.65	+ .032	+ .031

Assumed Mean Difference : 0.222

Normals :

			R
$+13.00\,x$	$+4.51\,y$	$+10.53\,z$	$= +0.005$
$+4.51$	$+36.98$	$+6.14$	$= +0.042$
$+10.53$	$+6.14$	$+38.70$	$= -0.014$

Solution :

	R	R	
$x =$	$+0.0006$	± 0.0047	Wt. 9.93
$y =$	$+0.0012$	± 0.0025	35.22
$z =$	-0.0007	± 0.0027	30.02

$[nn] = 0.00491$ $[vv] = 0.00484$ Prob. Error, 1 Eq. $= \pm 0''.188$

$\pi = +0''.015 \pm 0''.032$

Weisse 15^h, 268	B. D. +1°, 3071	Mag. 8.7	R. A. 15^h 15.4^m	Decl. +1° 57′	Pos. Angle.
a	+1°, 3051	8.7	15 8.6	1 43	262°.0
b	+1°, 2968	8.6	15 22.3	2 16	79°.6

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Jan. 17	12 4	2	27	490.123	496.147	−0.018	+0.033	986.285
	22	12 21	1–2	25	.149	.138	.018	.033	.302
	Feb. 22	13 30	3	17.5	.106	.140	.018	.033	.261
1903	July 17	17 17	2–3	64	490.136	496.242	−0.009	+0.016	986.385
	23	17 10	3	69	.150	.214	.009	.016	.371
	24	17 6	3	68.5	.149	.218	.008	.015	.374
	25	16 55	2–3	70.5	.162	.221	.008	.015	.390
	27	17 19	2	60.5	.135	.223	.008	.015	.365
	Aug. 10	18 16	2–3	66	.147	.198	.008	.014	.351
1904	Jan. 14	12 16	2	20	490.125	496.187	+0.001	−0.001	986.312
	Feb. 11	12 36	2	5.5	.086	.186	.002	.004	.270
	11	13 9	2	5.5	.107	.162	.002	.004	.267
	Assumed Annual Proper Motion and Mean Sum:						−0.019	+0.035	986.328

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	6.024	+0.000	6.075	+1.0 x	−1.53 y	−0.95 z =	−0.007	+0.007
C.	5.989	+ .000	.040	1.0	1.61	0.94	− .042	− .028
C.	6.034	+ .000	.085	1.0	1.74	0.94	+ .003	+ .018
C.	6.106	−0.000	6.131	+1.0 x	+1.59 y	−0.46 z =	+0.049	+0.036
C.	.064	− .000	.089	1.0	1.65	0.45	+ .007	− .006
C.	.069	− .000	.092	1.0	1.66	0.44	+ .010	− .004
C.	.059	− .000	.082	1.0	1.67	0.44	+ .000	− .014
C.	.088	− .000	.111	1.0	1.69	0.43	+ .029	+ .015
C.	.051	− .000	.073	1.0	1.81	0.40	− .009	− .024
C.	6.062	+0.000	6.060	+1.0 x	−1.47 y	+0.04 z =	−0.022	−0.010
C.	.100	+ .000	.094	1.0	1.78	0.11	+ .012	+ .027
C.	.055	+ .000	.049	1.0	1.78	0.11	− .033	− .018
	Assumed Mean Difference:		6.082					

Normals:

			R	
+ 12.00 x	+ 0.16 y	− 5.19 z	=	− 0.003
+ 0.16	+ 33.40	− 0.24	=	+ 0.281
− 5.19	− 0.24	+ 3.81	=	+ 0.001

Solution:

	R	R	
x =	− 0.0000	± 0.0069	Wt. 4.95
y =	+ 0.0084	± 0.0026	33.38
z =	+ 0.0008	± 0.0122	1.56

$[nn] = 0.00701$ $[vv] = 0.00463$ Prob. Error 1 Eq. = $\pm$ 0.″194

$\pi = + 0.''106 \pm 0.''033$

39 Serpentis	B. D. +13°, 3024	Mag. 6.3	R. A. $15^h\ 46.5^m$	Decl. +13° 39′	Pos. Angle.
a	+14°, 2940	7.0	15 41.5	14 15	296°.0
b	+13°, 3037	8.0	15 51.6	13 15	107°.1

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1892 Sept. 28	20 28	3	61.5	381.954	374.314	+0.016	+0.005	756.289
29	20 26	2–3	51.5	.957	.337	.016	.005	.315
30	19 56	2	59	.960	.339	.016	.005	.320
1893 Feb. 16	13 19	3–4	19	381.972	374.328	+0.013	+0.004	756.317
26	13 18	3–4	16	.969	.306	.013	.004	.292
Mar. 4	13 9	3	14	.950	.344	.013	.004	.311
1897 Feb. 16	12 32	2–3	23.5	381.979	374.319	−0.015	−0.004	756.279
18	12 43	1–2	28.5	.989	.351	.015	.004	.321
24	14 45	2	22	.981	.314	.015	.004	.276
1897 Aug. 9	18 55	2	66	382.002	374.358	−0.018	−0.005	756.337
12	18 59	3	64.5	381.991	.336	.018	.005	.304
20	18 31	2–3	60.5	382.010	.357	.018	.005	.344
Assumed Annual Proper Motion and Mean Sum:						+0.007	+0.002	756.309

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	7.640	+0.000	7.651	$+1.0\,x$	$-1.31\,y$	$-2.26\,z$ =	+0.009	+0.012
C.	.620	− .000	.631	1.0	1.28	2.26	− .011	− .008
C.	.621	− .000	.632	1.0	1.25	2.26	− .010	− .007
C.	7.644	−0.000	7.653	$+1.0\,x$	$+1.92\,y$	$-1.87\,z$ =	+0.011	+0.007
C.	.663	+ .000	.672	1.0	1.83	1.85	+ .030	+ .026
C.	.606	− .000	.615	1.0	1.75	1.83	− .027	− .030
C.	7.660	+0.000	7.649	$+1.0\,x$	$+1.92\,y$	$+2.13\,z$ =	+0.007	+0.004
C.	.638	− .000	.627	1.0	1.91	2.13	− .015	− .018
C.	.667	+ .000	.656	1.0	1.85	2.15	+ .014	+ .011
C.	7.644	−0.000	7.631	$+1.0\,x$	$-2.00\,y$	$+2.60\,z$ =	−0.011	−0.006
C.	.655	+ .000	.642	1.0	2.01	2.61	+ .000	+ .005
C.	.653	− .000	.640	1.0	1.99	2.63	− .002	+ .003
Assumed Mean Difference:	7.642							

Normals:

$$+12.00\,x + 1.34\,y + 1.92\,z = -0.005$$
$$+1.34\,x + 37.78\,y - 5.05\,z = +0.079$$
$$+1.92\,x - 5.05\,y + 59.79\,z = -0.020$$

Solution:

	R	R	
x =	−0.0006	± 0.0032	Wt. 11.88
y =	+0.0021	± 0.0018	37.17
z =	−0.0001	± 0.0015	58.75

$[nn] = 0.00264$ $[vv] = 0.00247$ Prob. Error 1 Eq. = ± 0″.142

$\pi = +0''.026 \pm 0''.023$

χ Herculis	B. D. +42°, 2648	Mag. 4.3	R. A. $15^h\ 47.7^m$	Decl. +42° 51′	Pos. Angle.
a	+42°, 2635	7.3	15 41.3	42 55	272°.2
b	+42°, 2655	8.5	15 52.8	42 39	102°.3

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Jan.	31	10 45	–	24	334.223	275.351	+0.040	−0.020	609.594
	Feb.	6	10 8	3	25	.220	.353	.039	.019	.593
		22	11 47	3	17.5	.205	.336	.037	.018	.560
1903	Aug.	7	19 50	3–4	55	334.232	275.389	+0.017	−0.008	609.630
		14	20 36	3	60.5	.247	.353	.017	.008	.609
		15	20 52	3–4	62	.260	.342	.016	.008	.610
		18	19 59	–	65.5	.253	.357	.016	.008	.618
	Sept.	2	20 12	3	61	.227	.356	.014	.007	.590
		3	20 22	2	62.5	.237	.374	.014	.007	.618
1904	Mar.	3	11 27	3–4	21	334.274	275.334	−0.007	+0.003	609.604
		9	11 41	3	21.5	.247	.312	.008	.004	.555
		20	12 6	2–3	27.5	.268	.326	.009	.004	.589
							Assumed Annual Proper Motion and Mean Sum:	+0.043	−0.021	609.597

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	58.872	+0.000	58.932	$+1.0\,x$	$+1.89\,y$	$-0.92\,z$ =	+0.016	+0.004
C.	.867	+ .000	.925	1.0	1.92	0.90	+ .009	− .004
C.	.869	+ .004	.928	1.0	1.88	0.86	+ .012	− .000
C.	58.843	−0.003	58.865	$+1.0\,x$	$-1.97\,y$	$-0.40\,z$ =	−0.051	−0.038
C.	.894	− .001	.918	1.0	1.99	0.39	+ .002	+ .015
C.	.918	− .001	.941	1.0	2.00	0.38	+ .025	+ .038
C.	.896	− .002	.918	1.0	1.99	0.37	+ .002	+ .015
C.	.871	+ .001	.893	1.0	1.89	0.33	− .023	− .011
C.	.863	− .002	.882	1.0	1.88	0.33	− .034	− .022
C.	58.940	−0.001	58.929	$+1.0\,x$	$+1.79\,y$	$+0.17\,z$ =	+0.013	+0.000
C.	.935	+ .004	.927	1.0	1.74	0.18	+ .011	− .001
C.	.942	+ .001	.930	1.0	1.58	0.21	+ .014	+ .003
	Assumed Mean Difference: 58.916							

Normals:

$$\begin{aligned} +12.00\,x - 0.92\,y - 4.32\,z &= -0.004 \\ -0.92\,x + 42.42\,y + 0.16\,z &= +0.284 \\ -4.32\,x + 0.16\,y + 3.31\,z &= +0.002 \end{aligned}$$

Solution:

	R	R	
x =	+0.0006	± 0.0056	Wt. 6.36
y =	+0.0067	± 0.0022	42.33
z =	+0.0010	± 0.0106	1.75

$[nn] = 0.00588$ $\quad [vv] = 0.00398$ $\quad$ Prob. Error 1 Eq. = $\pm\,0''.180$

$$\pi = +0''.085 \pm 0''.028$$

γ Serpentis	B. D. +16°, 2849	Mag. 3.8	R. A. $15^h\ 49.8^m$	Decl. +16° 9′	Pos. Angle.
a	+15°, 2925	7·5	15 46.3	15 52	252°.8
b	+16°, 2865	8.4	15 53.8	16 5	92°.3

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 Sept. 20	20 27	2–3	53	249·144	271.922	—0.016	—0.068	520.982
21	19 49	2–3	53·5	.129	.978	.016	.068	521.023
25	19 54	3	64.5	.140	.954	.016	.067	.011
1893 Mar. 4	12 35	3	14	249.122	271.896	—0.013	—0.055	520.950
5	12 49	3	14.5	.129	.907	.013	.055	.968
6	13 24	1–2	22	.138	.920	.013	.055	.990
1897 Feb. 16	11 58	2–3	23.5	249.098	271.768	+0.015	+0.064	520.945
19	12 9	3	18	.095	.791	.015	.064	.965
24	14 4	2	22	.102	.785	.015	.064	.966
1897 Aug. 11	19 9	3	69	249.101	271.801	+0.018	+0.078	520.998
12	19 31	3	62	.116	.818	.018	.078	521.030
20	19 0	2–3	59.5	.109	.812	.018	.079	.018
Assumed Annual Proper Motion and Mean Sum:						—0.007	—0.030	520.987

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	22.778	+0.000	22.726	$+1.0\,x$	$+1.72\,y$	$-2.28\,z$	$=-0.022$	—0.036
C.	.849	— .002	.795	1.0	1.70	2.28	+ .047	+ .034
C.	.814	— .001	.762	1.0	1.65	2.27	+ .014	+ .001
C.	22.774	+0.002	22.734	$+1.0\,x$	$-1.81\,y$	$-1.83\,z$	$=-0.014$	—0.002
C.	.778	+ .001	.737	1.0	1.80	1.83	— .011	+ .001
C.	.782	— .000	.740	1.0	1.79	1.83	— .008	+ .004
C.	22.670	+ .002	22.721	$+1.0\,x$	$-1.84\,y$	$+2.13\,z$	$=-0.027$	—0.013
C.	.696	+ .001	.746	1.0	1.85	2.13	— .002	+ .012
C.	.683	+ .001	.733	1.0	1.84	2.15	— .015	— .001
C.	22.700	—0.000	22.760	$+1.0\,x$	$+1.84\,y$	$+2.61\,z$	$=+0.012$	—0.000
C.	.702	— .002	.760	1.0	1.85	2.61	+ .012	— .000
C.	.703	— .001	.763	1.0	1.89	2.63	+ .015	+ .002
Assumed Mean Difference:	22.748							

R

Normals: $+12.00\,x - 0.28\,y + 1.94\,z = +0.001$

$-0.28 + 38.87 + 1.11 = +0.280$

$+1.94 + 1.11 + 59.84 = -0.021$

R R

Solution: $x = +0.0003 \pm 0.0034$ Wt. 11.94

$y = +0.0072 \pm 0.0019$ 38.84

$z = -0.0005 \pm 0.0015$ 59.50

$[nn] = 0.00474$ $[vv] = 0.00276$ Prob. Error 1 Eq. $= \pm 0''.150$

$\pi = +0''.090 \pm 0''.024$

ρ Coronae bor.	B. D. +33°, 2663	Mag. 5.7	R. A. $15^h\ 55.5^m$	Decl. +33° 45′	Pos. Angle.
a	+34°, 2709	7.3	15 49.4	34 48	309°.7
b	+32°, 2675	7.0	16 0.2	32 38	138°.2

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893 Aug. 3	19	55	2	63	465.527	414.370	+0.037	−0.052	879.882
7	19	50	3	65	.530	.367	.036	.052	.881
11	18	34	2–3	71	.507	.365	.036	.051	.857
1895 Mar. 16	11	31	3–4	19.5	465.540	414.258	−0.005	+0.007	879.800
18	11	21	2–3	28.5	.537	.281	.005	.008	.821
23	10	59	2–3	29.5	.562	.277	.006	.008	.841
1896 Mar. 21	13	32	–	31	465.561	414.239	−0.032	+0.045	879.813
24	12	31	3–4	16.5	.562	.268	.032	.045	.843
27	12	40	1–2	21	.568	.224	.032	.045	.805
1897 Aug. 17	19	2	2	62	465.648	414.223	−0.068	+0.097	879.900
26	19	30	2	62.5	.625	.205	.069	.098	.859
31	19	41	2	59.5	.629	.194	.069	.098	.852
Assumed Annual Proper Motion and Mean Sum:							+0.026	−0.037	879.846

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	51.157	−0.002	51.244	$+1.0\,x$	$-1.87\,y$	$-1.41\,z$	$=-0.007$	+0.001
C.	.163	− .002	.249	1.0	1.83	1.40	− .002	+ .006
C.	.142	− .001	.228	1.0	1.78	1.39	− .023	− .015
C.	51.282	+0.003	51.273	$+1.0\,x$	$+0.96\,y$	$+0.20\,z$	$=+0.022$	+0.020
C.	.256	+ .001	.244	1.0	0.90	0.21	− .007	− .008
C.	.285	+ .000	.271	1.0	0.76	0.22	+ .020	+ .019
C.	51.322	+0.002	51.247	$+1.0\,x$	$+0.82\,y$	$+1.22\,z$	$=-0.004$	−0.009
C.	.294	+ .000	.217	1.0	0.72	1.23	− .034	− .038
C.	.344	+ .002	.269	1.0	0.61	1.23	+ .018	+ .014
C.	51.425	−0.003	51.257	$+1.0\,x$	$-1.71\,y$	$+2.62\,z$	$=+0.006$	+0.001
C.	.420	− .001	.252	1.0	1.55	2.65	+ .001	− .004
C.	.435	− .000	.268	1.0	1.44	2.66	+ .017	+ .012
Assumed Mean Difference:	51.251							

Normals:

			R
$+12.00\,x$	$-5.41\,y$	$+8.04\,z$	$=+0.007$
-5.41	$+21.28$	-1.56	$=+0.036$
$+8.04$	-1.56	$+31.48$	$=+0.091$

Solution:

	R	R	
$x =$	-0.0008	± 0.0041	Wt. 8.76
$y =$	$+0.0018$	± 0.0028	18.67
$z =$	$+0.0032$	± 0.0024	25.85

$[nn] = 0.00334$ $\quad [vv] = 0.00300$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.156$

$$\pi = +0''.023 \pm 0''.036$$

Groom. 2305	B. D. +39°, 2947	Mag. 6.5	R. A. $15^h\ 59.9^m$	Decl. +39° 32′	Pos. Angle.
a	+39°, 2942	6.7	15 55.8	39 34	272°.2
b	+39°, 2954	7.8	16 2.3	39 31	90°.8
c	+39°, 2958	8.3	16 5.6	39 31	90°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance ½ (*b* + *c*). R	P. M. Corrections. R	R	Corrected Sum. R
1903	Jan. 31	11 27	−	25	226.398	221.260	−0.055	+0.032	447.635
	Feb. 6	10 44	3	25.5	.394	.269	.054	.031	.640
	Mar. 1	12 0	2–3	21	.393	.241	.050	.029	.613
1903	Aug. 7	20 40	3–4	54	226.376	221.291	−0.024	+0.014	447.657
	10	18 59	2–3	66	.359	.274	.024	.014	.623
	15	19 49	3–4	62	.348	.300	.023	.013	.638
	20	20 1	3–4	64	.351	.278	.022	.013	.620
	21	19 49	2–3	63	.353	.290	.022	.013	.634
	Sept. 2	20 48	3	60.5	.367	.295	.020	.012	.654
1904	Mar. 3	12 14	3–4	21	226.330	221.300	+0.010	−0.006	447.634
	16	11 49	3–4	19.5	.325	.314	.012	.007	.644
	22	12 45	2–3	27.5	.336	.270	.013	.008	.611
						Assumed Annual Proper Motion and Mean Sum:	−0.060	+0.035	447.634

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	5.138	−0.000	5.051	$+1.0\,x$	$+1.81\,y$	$-0.92\,z$	$= +0.006$	−0.003
C.	.125	− .000	.040	1.0	1.92	0.90	− .005	− .014
C.	.152	+ .000	.073	1.0	1.90	0.84	+ .028	+ .019
C.	5.085	−0.000	5.047	$+1.0\,x$	$-1.93\,y$	$-0.40\,z$	$= +0.002$	+0.011
C.	.085	+ .000	.047	1.0	1.95	0.40	+ .002	+ .011
C.	.048	− .000	.012	1.0	1.98	0.38	− .033	− .023
C.	.073	+ .000	.038	1.0	1.99	0.37	− .007	+ .003
C.	.063	+ .000	.028	1.0	1.98	0.37	− .017	− .007
C.	.072	− .000	.040	1.0	1.96	0.33	− .005	+ .004
C.	5.030	+0.000	5.046	$+1.0\,x$	$+1.88\,y$	$+0.17\,z$	$= +0.001$	−0.009
C.	.011	− .000	.030	1.0	1.77	0.20	− .015	− .025
C.	.066	+ .000	.087	1.0	1.71	0.22	+ .042	+ .032
			Assumed Mean Difference:	5.045				

Normals:

$$+12.00\,x - 0.80\,y - 4.32\,z = -0.001$$
$$-0.80\,x + 43.32\,y + 0.48\,z = +0.216$$
$$-4.32\,x + 0.48\,y + 3.34\,z = +0.034$$

Solution:

	R	R	
$x =$	$+0.0007$	± 0.0051	Wt. 6.40
$y =$	$+0.0050$	± 0.0019	43.25
$z =$	$+0.0012$	± 0.0095	1.78

$[nn] = 0.00429$ R $\quad [vv] = 0.00320$ R $\quad$ Prob. Error 1 Eq. $= \pm 0''.162$

$$\pi = +0''.063 \pm 0''.025$$

Lal. 29439	B. D. + 39°, 2950	Mag. 8.4	R. A. 16^h 1.3^m	Decl. +39° 3′	Pos. Angle.
a	+ 39°, 2942	6.7	15 55.8	39 34	296°.9
b	+ 38°, 2736	6.8	16 8.0	38 27	114°.1

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Jan. 31	12	8	–	25	341.407	409.947	+0.040	−0.030	751.364
	Feb. 22	12	32	3	17.5	.413	.929	.037	.028	.351
	Mar. 1	12	47	2–3	21.5	.406	.938	.036	.028	.352
1903	Aug. 10	19	43	2–3	66	341.432	409.947	+0.017	−0.013	751.383
	14	19	54	3	61	.441	.940	.016	.013	.384
	18	20	38	–	65	.461	.953	.016	.012	.418
	20	20	43	3–4	64	.468	.961	.016	.012	.433
	21	20	25	2–3	62	.424	.944	.016	.012	.372
	Sept. 3	20	56	2	62	.439	410.006	.015	.011	.449
1904	Mar. 9	12	25	3	20.5	341.431	409.902	−0.008	+0.006	751.331
	16	11	4	3–4	19.5	.452	.896	.009	.007	.346
	23	10	51	3–4	39	.482	.911	.009	.007	.391
	Assumed Annual Proper Motion and Mean Sum:							+0.043	−0.033	751.379

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	68.540	+0.001	68.471	$+1.0x$	$-1.97y$	$-0.92z$	$= -0.001$	+0.006
C.	.516	+ .003	.454	1.0	1.80	0.86	− .018	− .012
C.	.532	+ .002	.470	1.0	1.67	0.84	− .002	+ .004
C.	68.515	−0.000	68.485	$+1.0x$	$+2.02y$	$-0.40z$	$= +0.013$	+0.006
C.	.499	− .001	.469	1.0	2.00	0.38	− .003	− .009
C.	.492	− .004	.460	1.0	1.98	0.37	− .012	− .018
C.	.493	− .005	.460	1.0	1.95	0.37	− .012	− .018
C.	.520	+ .001	.493	1.0	1.94	0.37	+ .021	+ .015
C.	.567	− .006	.535	1.0	1.75	0.33	+ .063 Wt. ½	+ .059
C.	68.471	+0.004	68.489	$+1.0x$	$-1.53y$	$+0.18z$	$= +0.017$	+0.023
C.	.444	+ .003	.463	1.0	1.39	0.20	− .009	− .003
C.	.429	− .001	.444	1.0	1.23	0.22	− .028	− .022
	Assumed Mean Difference:		68.472					

The observation on 1903, Sept. 3 was a "half set" only.

Normals:

$$\begin{aligned} +11.50x + 1.18y - 4.07z &= -0.002 \\ +1.18x + 36.79y - 0.10z &= +0.128 \\ -4.07x - 0.10y + 3.19z &= -0.000 \end{aligned}$$

Solution:

	R	R	
$x =$	−0.0009	± 0.0056	Wt. 6.27
$y =$	+0.0035	± 0.0023	36.62
$z =$	−0.0011	± 0.0107	1.74

$[nn] = 0.00441$ $[p.vv] = 0.00398$ Prob. Error 1 Eq. $= \pm 0''.179$

$$\pi = +0''.044 \pm 0''.029$$

Lal. 29437–8	B. D. +6°, 3169	Mag. 6.5	R. A. 16^h 2.1^m	Decl. +6° 48′	Pos. Angle.
a	+6°, 3149	7.9	15 57.2	6 23	252°.6
b	+7°, 3120	7.5	16 6.8	7 22	63°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 Sept. 26	20 15	3	51	358.381	370.609	0.000	+0.009	728.999
27	20 1	3	52.5	.395	.574	.000	.009	.978
Oct. 4	20 23	–	52	.394	.622	.000	.009	729.025
6	20 21	3	44	.408	.584	.000	.009	.001
1893 Feb. 16	14 4	2–3	17	358.363	370.582	0.000	+0.008	728.953
22	14 1	–	18.5	.356	.557	.000	.008	.921
26	13 54	3	15.5	.361	.563	.000	.008	.932
1897 Feb. 16	13 8	2–3	23.5	358.367	370.577	0.000	–0.008	728.936
18	14 27	1–2	29.5	.362	.588	.000	.008	.942
19	13 46	3	18	.363	.580	.000	.008	.935
1897 Aug. 9	18 8	2	66.5	358.397	370.624	0.000	–0.010	729.011
11	18 9	3	69.5	.398	.623	.000	.010	.011
12	18 9	3	64	.390	.618	.000	.010	728.998
Assumed Annual Proper Motion and Mean Sum :						0.000	+0.004	728.973

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	12.228	–0.000	12.237	$+1.0x$	$+1.64y$	$-2.27z$	$= +0.023$	+0.024
C.	.179	– .000	.188	1.0	1.63	2.26	– .026	– .025
C.	.228	– .001	.236	1.0	1.54	2.24	+ .022	+ .023
C.	.176	– .000	.185	1.0	1.51	2.24	– .029	– .028
C.	12.219	+0.000	12.227	$+1.0x$	$-1.65y$	$-1.87z$	$= +0.013$	+0.014
C.	.201	+ .001	.210	1.0	1.69	1.86	– .004	– .003
C.	.202	+ .001	.211	1.0	1.69	1.85	– .003	– .002
C.	12.210	+0.001	12.203	$+1.0x$	$-1.65y$	$+2.13z$	$= -0.011$	–0.010
C.	.226	+ .001	.219	1.0	1.67	2.13	+ .005	+ .005
C.	.217	+ .001	.210	1.0	1.68	2.13	– .004	– .003
C.	12.227	–0.001	12.216	$+1.0x$	$+1.57y$	$+2.60z$	$= +0.002$	+0.002
C.	.225	– .001	.214	1.0	1.60	2.61	+ .000	+ .000
C.	.228	– .000	.218	1.0	1.61	2.61	+ .004	+ .004
Assumed Mean Difference :			12.214					

Normals :

$$+13.00x + 1.07y - 0.38z = -0.008$$
$$+1.07 + 34.38 - 3.06 = +0.003$$
$$-0.38 - 3.06 + 64.68 = +0.008$$

Solution :

	R	R	
$x =$	-0.0006	± 0.0032	Wt. 12.97
$y =$	$+0.0001$	± 0.0020	34.16
$z =$	$+0.0001$	± 0.0014	64.40

$[nn] = 0.00291$ $[vv] = 0.00290$ Prob. Error 1 Eq. $= \pm 0''.146$

$$\pi = +0''.001 \pm 0''.025$$

Lal. 30024–6	B. D. +18°, 3182	Mag. 7.0	R. A. 16^h 22.5^m	Decl. +18° 44′	Pos. Angle.
a	+18°, 3175	8.1	16 20.1	18 45	271°.2
b	+18°, 3187	7.9	16 24.3	18 57	61°.7

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Sept. 21	20	32	2–3	52.5	162.398	135.853	−0.055	+0.014	298.210
	25	20	48	3	64.5	.334	.834	.054	.014	.128
	26	20	57	3	50.5	.384	.864	.054	.014	.208
1893	Mar. 4	13	41	3	14	162.366	135.844	−0.044	+0.011	298.177
	12	13	0	3–4	37.5	.355	.848	.043	.011	.171
	29	14	17	1–2	24.5	.396	.875	.042	.011	.240
1897	Feb. 18	13	33	1–2	29.5	162.278	135.847	+0.051	−0.013	298.163
	19	12	46	3	18	.272	.845	.051	.013	.155
	Mar. 10	14	41	2	28.5	.260	.883	.051	.013	.181
1897	Aug. 9	19	24	2	65	162.251	135.901	+0.062	−0.016	298.198
	11	19	47	3	68.5	.260	.903	.063	.016	.210
	20	19	36	2–3	59	.270	.890	.063	.016	.207
	Assumed Annual Proper Motion and Mean Sum:							−0.024	+0.006	298.187

Observer.	Difference. R	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	26.545	−0.001	26.475	$+1.0x$	$-1.75y$	$-2.28z$	$=+0.017$	+0.027
C.	.500	+ .005	.437	1.0	1.74	2.27	= .021	− .011
C.	.520	− .002	.450	1.0	1.73	2.26	= .008	+ .002
C.	26.522	+0.001	26.468	$+1.0x$	$+1.77y$	$-1.83z$	$=+0.010$	−0.002
C.	.507	+ .001	.454	1.0	1.78	1.81	= .004	− .016
C.	.521	− .005	.463	1.0	1.67	1.76	= .005	− .007
C.	26.431	+0.002	26.497	$+1.0x$	$+1.69y$	$+2.13z$	$=+0.039$	+0.028
C.	.427	+ .003	.494	1.0	1.70	2.14	= .036	+ .025
C.	.377	+ .001	.442	1.0	1.78	2.19	= .016	− .027
C.	26.350	−0.001	26.427	$+1.0x$	$-1.61y$	$+2.60z$	$=-0.031$	−0.020
C.	.357	− .002	.434	1.0	1.63	2.61	= .024	− .013
C.	.380	− .002	.457	1.0	1.72	2.63	= .001	+ .011
	Assumed Mean Difference:		26.458					

Normals:

			R
$+12.00x$	$+0.20y$	$+2.09z$	$=+0.002$
$+0.20$	$+35.34$	$+0.65$	$=+0.229$
$+2.09$	$+0.65$	$+59.60$	$=-0.016$

Solution:

	R	R	
x	$=+0.0002$	± 0.0041	Wt. 11.93
y	$=+0.0065$	± 0.0024	35.33
z	$=-0.0003$	± 0.0018	59.23

$[nn] = 0.00555$ $\quad [vv] = 0.00404$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.181$

$$\pi = +0''.082 \pm 0''.030$$

Lal. 30044–5	B. D. +4°, 3195	Mag. 7.6	R. A. $16^h\ 23.4^m$	Decl. +4° 33′	Pos. Angle.
a	+4°, 3191	8.0	16 22.4	4 54	327°.2

	Date.	Sid. Time.	Def.	Temp.	Distance *a*.	P. M. Correction.	Corrected Sum from Lal. 29437–8.
		h. m.		°	R	R	R
1892	Sept. 27	20 30	3	53	121.437	+0.167	728.978
	30	20 28	2	58.5	.402	.166	729.001*
	Oct. 2	20 17	3–4	47	.458	.166	.001*
1893	Feb. 16	14 28	2	16	121.482	+0.138	728.953
	22	14 27	–	18.5	.482	.138	.921
	26	14 23	3	15	.470	.137	.932
1897	Feb. 18	14 0	1–2	30	121.746	−0.158	728.942
	19	13 18	3	18	.740	.158	.935
	19	14 10	3	18.5	.769	.158	.935
1897	Aug. 9	18 29	2	66	121.821	−0.192	729.011
	11	18 40	3	69	.824	.193	.011
	12	18 33	3	63.5	.806	.193	728.998
					Assumed Annual Proper Motion and Mean Sum:	+0.074	728.968

Observer.	Scale Value Correction.	Corrected Distance.	Equations of Condition.				Residuals.
	R	R				R	R
C.	−0.002	121.602	$+1.0\,x$	$-0.42\,y$	$-2.26\,z$	= −0.006	−0.005
C.	− .005	.563	1.0	0.38	2.25	− .045	− .044
C.	− .005	.619	1.0	0.36	2.25	+ .011	+ .012
C.	+0.002	121.622	$+1.0\,x$	$+0.69\,y$	$-1.87\,z$	= +0.014	+0.015
C.	+ .008	.628	1.0	0.66	1.86	+ .020	+ .021
C.	+ .006	.613	1.0	0.64	1.85	+ .005	+ .006
C.	+0.004	121.592	$+1.0\,x$	$+0.68\,y$	$+2.13\,z$	= −0.016	−0.017
C.	+ .005	.587	1.0	0.68	2.13	− .021	− .022
C.	+ .005	.616	1.0	0.68	2.13	+ .008	+ .007
C.	−0.007	121.622	$+1.0\,x$	$-0.74\,y$	$+2.60\,z$	= +0.014	+0.012
C.	− .007	.624	1.0	0.74	2.61	+ .016	+ .014
C.	− .005	.608	1.0	0.74	2.61	+ .000	− .001
	Assumed Mean Distance:	121.608					

Normals:

$$+12.00\,x + 0.65\,y + 1.87\,z = +0.000$$
$$+0.65\,x + 4.81\,y - 2.52\,z = +0.000$$
$$+1.87\,x - 2.52\,y + 59.60\,z = +0.034$$

Solution:

$$x = -0.0000 \pm 0.0041 \quad \text{Wt. } 11.83$$
$$y = +0.0000 \pm 0.0065 \quad 4.66$$
$$z = +0.0006 \pm 0.0019 \quad 57.87$$

$[nn] = 0.00401$ $[vv] = 0.00394$ Prob. Error 1 Eq. $= \pm 0''.179$

$$\pi = +0''.000 \pm 0''.082$$

* These sums are the mean value of the group for Lal. 29437–8.

ζ Herculis	B. D. +31°, 2884	Mag. 3.0	R. A. 16h 35.9m	Decl. +31° 52′	Pos. Angle.
a	+31°, 2864	7.8	16 27.6	31 13	249°.7
b	+32°, 2788	8.0	16 42.7	32 41	61°.3

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr.	10	12	21	–	46	404.785	474.332	—0.024	+0.022	879.115
		11	13	6	–	44	.797	.291	.024	.022	.086
		19	11	57	1–2	46	.778	.297	.024	.021	.072
1903	Sept.	21	20	39	3	57	404.766	474.339	—0.009	+0.008	879.104
		22	19	59	3	66	.752	.360	.009	.008	.111
		25	19	38	2	54	.753	.334	.009	.008	.086
		28	20	32	3	49	.744	.346	.009	.008	.089
		29	20	51	2	55	.754	.352	.008	.008	.106
	Oct.	3	20	12	3	56	.734	.354	.008	.007	.087
1905	Apr.	16	12	20	3	32	404.690	474.350	+0.043	—0.039	879.044
		18	11	55	2	36	.727	.368	.044	.039	.100
		30	12	5	3	56	.739	.379	.045	.040	.123
									—0.034	+0.030	879.094

Assumed Annual Proper Motion and Mean Sum: —0.034 +0.030 879.094

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	69.547	—0.002	69.591	+1.0 x	—1.75 y	—0.72 z	= +0.001	+0.023
S.	.494	+ .001	.541	1.0	1.73	0.72	— .049	— .025
S.	.519	+ .002	.566	1.0	1.63	0.70	— .024	— .001
S.	69.573	—0.001	69.589	+1.0 x	+1.84 y	—0.27 z	= —0.001	—0.024
S.	.608	— .001	.624	1.0	1.83	0.27	+ .034	+ .011
S.	.581	+ .001	.599	1.0	1.83	0.26	+ .009	— .014
S.	.602	+ .000	.619	1.0	1.82	0.26	+ .029	+ .006
S.	.598	— .001	.613	1.0	1.82	0.25	+ .023	+ .000
S.	.620	+ .001	.636	1.0	1.81	0.24	+ .046	+ .023
S.	69.660	+0.004	69.582	+1.0 x	—1.67 y	+1.29 z	= —0.008	+0.019
S.	.641	— .000	.558	1.0	1.64	1.30	— .032	— .005
S.	.640	— .002	.553	1.0	1.44	1.33	— .037	— .013

Assumed Mean Difference: 69.590

Normals:

$$\begin{aligned} +\ 12.00\,x + \ 1.09\,y + 0.23\,z &= -0.011 \\ +\ 1.09\,x + 36.25\,y - 5.38\,z &= +0.491 \\ +\ 0.23\,x - \ 5.38\,y + 7.05\,z &= +0.104 \end{aligned}$$

(R)

Solution:

	R	R	
x	= —0.0022	± 0.0062	Wt. 4.3
y	= +0.0136	± 0.0023	32.0
z	= —0.0020	± 0.0052	6.2

$[nn] = 0.01013$ $[vv] = 0.00325$ Prob. Error 1 Eq. = ± 0″.164

$\pi = +\ 0''.172 \pm 0''.029$

Lal. 30699	B. D. +68°, 883	Mag. 7.6	R. A. 16^h 43.0^m	Decl. +68° 21′	Pos. Angle.
a	+67°, 945	8.3	16 30.2	67 40	234°.0
b	+68°, 906	8.3	16 58.4	68 55	55°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr.	1	12	22	3	42	489.450	523.141	+0.007	+0.001	1012.599
		4	10	39	3	28	.431	.107	.007	.001	.546
		5	11	9	3	31	.410	.105	.007	.001	.523
1903	Oct.	13	20	28	3	56	489.454	523.131	+0.002	+0.000	1012.587
		17	21	9	2	47	.454	.133	.002	.000	.589
		18	20	41	2	45	.433	.140	.002	.000	.575
		19	21	10	3	52	.431	.163	.002	.000	.596
		20	21	14	2	50	.434	.131	.002	.000	.567
		21	20	53	2	50	.422	.119	.002	.000	.543
1905	Apr.	16	10	53	3	33	489.441	523.134	−0.012	−0.003	1012.560
		17	11	20	2	37	.458	.119	.012	.003	.562
		18	10	58	2	37	.447	.114	.012	.003	.546
									+0.009	+0.002	1012.566

Assumed Annual Proper Motion and Mean Sum : +0.009 +0.002 1012.566

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	33.691	−0.001	33.684	+1.0 x	−1.94 y	−0.75 z	= +0.004	+0.002
S.	.676	+ .001	.671	1.0	1.96	0.74	= −.009	− .011
S.	.695	+ .001	.690	1.0	1.97	0.74	= + .010	+ .008
S.	33.677	−0.001	33.674	+1.0 x	+1.95 y	−0.21 z	= −0.006	−0.022
S.	.679	− .001	.676	1.0	1.94	0.20	= − .004	− .020
S.	.707	− .000	.705	1.0	1.93	0.20	= + .025	+ .009
S.	.732	− .001	.729	1.0	1.93	0.20	= + .049	+ .033
S.	.697	− .000	.695	1.0	1.93	0.19	= + .015	− .001
S.	.697	+ .001	.696	1.0	1.93	0.19	= + .016	+ .000
S.	33.693	+0.000	33.702	+1.0 x	−1.96 y	+1.29 z	= +0.022	+0.019
S.	.661	+ .000	.670	1.0	1.95	1.30	= − .010	− .013
S.	.667	+ .001	.677	1.0	1.94	1.30	= − .003	− .006

Assumed Mean Difference : 33.680

Normals :

			R
+12.00 x	− 0.11 y	+ 0.47 z	= +0.109
− 0.11	+45.32	− 5.55	= +0.155
+ 0.47	− 5.55	+ 6.94	= +0.175

Solution :

	R	R	
x =	+0.0091	± 0.0035	Wt. 12.0
y =	+0.0035	± 0.0019	40.9
z =	+0.0008	± 0.0048	6.2

$[nn] = 0.00435$ $[vv] = 0.00290$ Prob. Error 1 Eq. = ± 0.″154

$\pi = +0.''044 \pm 0.''024$

Lal. 30694	B. D. +0°, 3593	Mag. 7.0	R. A. $16^h\ 45.7^m$	Decl. +0° 17′	Pos. Angle.
a	+0°, 3583	8.4	16 41.9	0 11	264°.6
b	+0°, 3597	8.6	16 48.0	0 20	83°.1

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct.	1	20	1	2	52.5	265.230	168.128	—0.157	+0.146	433.347
		2	20	42	3–4	47	.226	.165	.157	.146	.380
		8	19	39	–	59	.240	.132	.156	.145	.361
1893	Feb.	22	15	4	–	18.5	265.205	168.128	—0.130	+0.121	433.324
	Mar.	6	14	0	2	21.5	.192	.150	.128	.119	.333
		27	14	21	1–2	28.5	.198	.160	.124	.115	.349
1896	Mar.	30	14	34	2	39.5	264.996	168.334	+0.087	—0.080	433.337
		31	14	21	3	41.5	.990	.342	.087	.080	.339
	Apr.	2	15	11	1–2	26.5	.989	.346	.087	.081	.341
1897	Aug.	26	20	2	2	61.5	264.862	168.469	+0.185	—0.172	433.344
		27	19	23	–	66	.896	.471	.185	.172	.380
		29	18	48	3	65.5	.879	.458	.186	.173	.350
							Assumed Annual Proper Motion and Mean Sum:		—0.070	+0.065	433.349

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	97.102	+0.000	96.799	$+1.0\,x$	$-1.79\,y$	$-2.25\,z$	$= +0.003$	+0.019
C.	.061	— .007	.751	1.0	1.77	2.25	— .045	— .029
C.	.108	— .003	.804	1.0	1.68	2.23	+ .008	+ .023
C.	97.077	+0.006	96.832	$+1.0\,x$	$+1.86\,y$	$-1.86\,z$	$= +0.036$	+0.014
C.	.042	+ .004	.799	1.0	1.91	1.83	+ .003	— .019
C.	.038	+ .000	.799	1.0	1.79	1.77	+ .003	— .018
C.	96.662	+0.003	96.832	$+1.0\,x$	$+1.74\,y$	$+1.24\,z$	$= +0.036$	+0.019
C.	.648	+ .002	.817	1.0	1.72	1.24	+ .021	+ .004
C.	.643	+ .002	.813	1.0	1.69	1.25	+ .017	+ .000
C.	96.393	+0.001	96.751	$+1.0\,x$	$-1.88\,y$	$+2.65\,z$	$= -0.045$	—0.023
C.	.425	— .007	.775	1.0	1.89	2.65	— .021	+ .001
C.	.421	— .000	.780	1.0	1.90	2.66	— .016	+ .007
	Assumed Mean Difference:		96.796					

Normals:

			R	
$+12.00\,x$	$-0.20\,y$	$-0.50\,z$	$= +0.000$	
-0.20	$+39.02$	-7.01	$= +0.423$	
-0.50	-7.01	$+50.79$	$= -0.127$	

Solution:

	R	R	
$x =$	$+0.0002$	± 0.0039	Wt. 12.00
$y =$	$+0.0106$	± 0.0022	38.04
$z =$	-0.0010	± 0.0019	49.51

$[nn] = 0.00816$ $\quad [vv] = 0.00356$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.170$

$$\pi = +0''.134 \pm 0''.028$$

Lal. 31132	B. D. +47°, 2420	Mag. 6.6	R. A. $16^h\ 58.5^m$	Decl. +47° 15′	Pos. Angle.
a	+46°, 2237	8.0	16 50.8	46 30	239°.7
b	+47°, 2435	7.9	17 4.8	47 50	61°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr.	5	11	45	3	30	430.961	338.160	+0.035	−0.022	769.134
		10	11	50	−	48	431.009	.169	.035	.022	.191
		12	10	50	4	44	430.974	.161	.034	.022	.147
1903	Sept.	21	21	7	3	56	431.028	338.206	+0.013	−0.008	769.239
		22	20	37	3	65	.022	.198	.013	.008	.225
		25	20	28	2	53	.010	.206	.012	.008	.220
		28	20	54	3	47	.025	.180	.012	.008	.209
		29	21	20	2	55	.003	.186	.012	.008	.193
	Oct.	3	20	45	3	55	.022	.195	.011	.007	.221
1905	Apr.	17	11	50	2	34	431.047	338.098	−0.062	+0.039	769.122
		18	11	25	2	36	.073	.085	.062	.039	.135
		30	11	34	3	57	.110	.122	.063	.040	.209
									Assumed Annual Proper Motion and Mean Sum :	+0.047	−0.030	769.187

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	92.801	+0.006	92.864	+1.0 x	+1.92 y	−0.74 z =	+0.004	−0.014
S.	.840	− .000	.897	1.0	1.93	0.72	+ .037	+ .019
S.	.813	+ .005	.874	1.0	1.91	0.72	+ .014	− .004
S.	92.822	−0.006	92.837	+1.0 x	−1.86 y	−0.27 z =	−0.023	−0.003
S.	.824	− .005	.840	1.0	1.87	0.27	− .020	+ .000
S.	.804	− .004	.820	1.0	1.90	0.26	− .040	− .020
S.	.845	− .003	.862	1.0	1.91	0.26	+ .002	+ .022
S.	.817	− .000	.837	1.0	1.92	0.25	− .023	− .003
S.	.827	− .004	.841	1.0	1.92	0.24	− .019	+ .001
S.	92.949	+0.008	92.856	+1.0 x	+1.85 y	+1.30 z =	−0.004	−0.022
S.	.988	+ .006	.893	1.0	1.84	1.30	+ .033	+ .015
S.	.988	− .003	.882	1.0	1.72	1.33	+ .022	+ .006
			Assumed Mean Difference :	92.860				

Normals :

$$+12.00\,x - 0.21\,y + 0.20\,z = -0.017$$
$$-0.21\,x + 42.43\,y + 5.82\,z = +0.430$$
$$+0.20\,x + 5.82\,y + 7.14\,z = +0.059$$

Solution :

	R	R	
x =	−0.0012	± 0.0031	Wt. 12.0
y =	+0.0101	± 0.0018	37.7
z =	+0.0000	± 0.0043	6.3

$[nn] = 0.00660$ $[vv] = 0.00220$ Prob. Error 1 Eq. = ± 0″.134

$\pi = +0''.128 \pm 0''.023$

72 w Herculis	B. D. +32°, 2896	Mag. 5.7	R. A. $17^h\ 15.3^m$	Decl. +32° 40′	Pos. Angle.
a	+32°, 2874	8.0	17 10.0	32 15	250°.9
b	+32°, 2923	8.0	17 22.2	32 55	79°.3

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903 Apr. 1	14 8	2–3	37.5	329.918	419.616	+0.002	+0.008	749.544
5	13 23	2	29.5	.893	.618	.002	.007	.520
17	13 55	3–4	40.5	.920	.601	.002	.007	.530
1903 Sept. 8	21 38	3	52.5	329.914	419.681	+0.001	+0.003	749.599
22	22 12	3	62	.908	.647	.001	.003	.559
28	21 47	3–4	46.5	.924	.663	.001	.003	.591
Oct. 13	21 29	3	53.5	.900	.648	.001	.002	.551
18	21 57	3–4	42	.892	.651	.001	.002	.546
19	21 52	3	50	.900	.659	.001	.002	.562
1904 Mar. 30	14 8	2–3	29.5	329.918	419.637	−0.001	−0.002	749.552
Apr. 3	13 11	3–4	27	.905	.611	.001	.003	.512
5	12 37	1–2	43	.916	.619	.001	.003	.531
Assumed Annual Proper Motion and Mean Sum:						+0.003	+0.010	749.550

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	89.698	+0.001	89.705	$+1.0\,x$	$-1.88\,y$	$-0.75\,z$	$= -0.025$	−0.004
C.	.725	+ .004	.734	1.0	1.87	0.74	+ .004	+ .025
C.	.681	+ .002	.688	1.0	1.74	0.71	− .042	− .022
C.	89.767	−0.006	89.763	$+1.0\,x$	$+1.87\,y$	$-0.32\,z$	$= +0.033$	+0.012
C.	.739	− .001	.740	1.0	1.93	0.28	+ .010	− .012
C.	.739	− .005	.736	1.0	1.92	0.26	+ .006	− .016
C.	.748	− .000	.749	1.0	1.83	0.22	+ .019	− .002
C.	.759	+ .000	.760	1.0	1.78	0.21	+ .030	+ .010
C.	.759	− .001	.759	1.0	1.76	0.20	+ .029	+ .009
C.	89.719	−0.000	89.718	$+1.0\,x$	$-1.89\,y$	$+0.24\,z$	$= -0.012$	+0.008
C.	.706	+ .005	.709	1.0	1.87	0.25	− .021	− .001
C.	.703	+ .002	.703	1.0	1.87	0.26	− .027	− .007
Assumed Mean Difference:	89.730							

Normals:

			R
$+12.00\,x$	$-0.03\,y$	$-2.94\,z$	$= +0.004$
-0.03	$+41.16$	-0.13	$= +0.457$
-2.94	-0.13	$+2.18$	$= -0.001$

Solution:

	R	R	
$x =$	$+0.0007$	± 0.0035	Wt. 8.05
$y =$	$+0.0111$	± 0.0016	41.15
$z =$	$+0.0012$	± 0.0083	1.46

$[nn] = 0.00704$ $[vv] = 0.00197$ Prob. Error 1 Eq. $= \pm 0''.126$

$\pi = +0''.141 \pm 0''.020$

Weisse 17^h, 322	B. D. $+2°$, 3312	Mag. 8.0	R. A. $17^h\ 18.5^m$	Decl. $+2°\ 17'$	Pos. Angle.
a	$+2°$, 3296	7.0	17 12.5	2 19	$270°.2$
b	$+2°$, 3343	8.0	17 25.1	2 11	$93°.7$

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Sept. 30	20	57	2	58.5	429.098	465.634	—0.108	+0.090	894.714
	Oct. 1	20	35	2	51.5	.106	.637	.108	.090	.725
	6	21	1	3	44	.077	.659	.108	.090	.718
1893	Mar. 27	16	4	2	27.5	429.083	465.618	—0.085	+0.071	894.687
	28	15	57	1–2	20	.085	.591	.085	.070	.661
1896	Mar. 31	14	50	3	40	428.927	465.733	+0.060	—0.050	894.670
	Apr. 2	15	43	1–2	26.5	.934	.718	.060	.050	.662
1897	Aug. 29	19	25	3	64.5	428.848	465.814	+0.128	—0.106	894.684
	31	20	36	2	59.5	.850	.851	.128	.107	.722
	Sept. 2	19	15	2	61	.854	.832	.128	.107	.707
	Assumed Annual Proper Motion and Mean Sum:							—0.048	+0.040	894.690

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	36.536	—0.001	36.733	$+1.0\,x$	$+1.90\,y$	$-2.26\,z$	$= +0.019$	—0.012
C.	.531	— .001	.728	1.0	1.89	2.25	+ .014	— .017
C.	.582	— .001	.779	1.0	1.83	2.24	+ .065	+ .035
C.	36.535	+0.000	36.691	$+1.0\,x$	$-1.89\,y$	$-1.77\,z$	$= -0.023$	+0.010
C.	.506	+ .001	.662	1.0	1.88	1.76	— .052	— .019
C.	36.806	+0.001	36.697	$+1.0\,x$	$-1.85\,y$	$+1.24\,z$	$= -0.017$	+0.015
C.	.784	+ .001	.675	1.0	1.83	1.25	— .039	— .008
C.	36.966	+0.000	36.732	$+1.0\,x$	$+1.93\,y$	$+2.66\,z$	$= +0.018$	—0.016
C.	37.001	— .001	.765	1.0	1.94	2.66	+ .051	+ .017
C.	36.978	— .001	.742	1.0	1.96	2.67	+ .028	— .006
	Assumed Mean Difference:		36.714					

Normals:

$$+10.00\,x + 4.00\,y + 0.20\,z = +0.064$$
$$+4.00\,x + 35.72\,y + 4.95\,z = +0.613$$
$$+0.20\,x + 4.95\,y + 45.81\,z = +0.101$$

Solution:

	R	R	
$x =$	-0.0004	± 0.0045	Wt. 9.55
$y =$	$+0.0172$	± 0.0024	33.60
$z =$	$+0.0003$	± 0.0021	45.12

$[nn] = 0.01353$ $\quad [vv] = 0.00298$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.176$

$$\pi = +0''.218 \pm 0''.030$$

Weisse 17^h, 322	B. D. +2°, 3312	Mag. 8.0	R. A. 17^h 18.5^m	Decl. +2° 17′	Pos. Angle.
a	+2°, 3296	7.0	17 12.5	2 19	270°.2
b	+2°, 3343	8.0	17 25.1	2 11	93°.7

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1899	Oct. 14	19	56	2–3	59	428.740	465.918	−0.011	+0.009	894.656
	19	20	32	2–3	61	.718	.871	.010	.008	.587
	20	21	3	2–3	47	.751	.883	.010	.008	.632
1900	Mar. 23	16	24	2–3	27	428.719	465.878	+0.011	−0.009	894.599
	27	16	19	2	29	.732	.861	.011	.009	.595
	Apr. 4	16	6	1–2	29.5	.728	.891	.012	.010	.621
	5	15	47	2–3	43	.729	.894	.012	.010	.625
	6	15	41	2	40	.756	.866	.012	.010	.624
	9	16	14	1–2	23	.719	.896	.013	.011	.617
1900	Oct. 17	19	45	3	43.5	428.655	465.917	+0.038	−0.032	894.578
	19	20	40	1–2	39.5	.672	.943	.038	.032	.621
	20	19	50	2–3	44	.674	.903	.039	.032	.584
							Assumed Annual Proper Motion and Mean Sum :	−0.048	+0.040	894.612

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	37.178	−0.002	37.196	$+1.0\,x$	$+1.68\,y$	$-0.22\,z$ =	+0.042	+0.023
C.	.153	+ .001	.172	1.0	1.60	0.20	+ .018	+ .000
C.	.132	− .001	.149	1.0	1.58	0.20	− .005	− .023
C.	37.159	+0.000	37.139	$+1.0\,x$	$-1.93\,y$	$+0.22\,z$ =	−0.015	+0.012
C.	.129	+ .001	.110	1.0	1.88	0.23	− .044	− .017
C.	.163	− .000	.141	1.0	1.79	0.25	− .013	+ .012
C.	.165	− .000	.143	1.0	1.78	0.26	− .011	+ .014
C.	.110	− .000	.088	1.0	1.77	0.26	− .066	− .041
C.	.177	− .000	.153	1.0	1.73	0.27	− .001	+ .023
C.	37.262	+0.001	37.193	$+1.0\,x$	$+1.63\,y$	$+0.79\,z$ =	+0.039	+0.008
C.	.271	− .000	.201	1.0	1.60	0.80	+ .047	+ .016
C.	.229	+ .001	.159	1.0	1.58	0.80	+ .005	− .025
			Assumed Mean Difference :	37.154				

Normals :

			R
$+12.00\,x$	$-1.21\,y$	$+3.26\,z$	$= -0.004$
-1.21	$+35.35$	$+0.13$	$= +0.513$
$+3.26$	$+0.13$	$+2.30$	$= +0.025$

Solution :

	R	R	
x =	−0.0026	± 0.0058	Wt. 7.33
y =	+0.0144	± 0.0027	35.08
z =	+0.0128	± 0.0134	1.40

$[nn] = 0.01268$ $\quad [vv] = 0.00505$ $\quad$ Prob. Error 1 Eq. = $\pm$ 0″.202

$\pi = +$ 0″.182 $\pm$ 0″.034

Weisse 17^h, 322	B. D. $+2°$, 3312	Mag. 8.0	R. A. 17^h 18.5^m	Decl. $+2°$ 17′	Pos. Angle.
c	$+1°$, 3421	7.2	17 13.8	1 35	239°.3
d	$+2°$, 3337	5.5	17 24.1	2 51	67°.8

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1899 Oct. 10	20 23	3–4	55.5	388.297	425.793	−0.019	+0.010	814.081
12	19 51	3–4	60	.326	.824	.018	.010	.142
13	19 58	3–4	59.5	.330	.825	.018	.010	.147
20	20 29	2–3	47	.300	.814	.017	.009	.106
1900 Mar. 23	15 34	2–3	27	388.334	425.818	+0.018	−0.010	814.160
25	15 10	1–2	26.5	.319	.822	.019	.010	.150
27	15 1	2	31	.297	.814	.019	.010	.120
31	14 43	3–4	29.5	.307	.810	.020	.011	.126
Apr. 4	15 33	2	30	.308	.812	.021	.011	.130
5	16 23	2–3	43.5	.289	.812	.022	.012	.111
6	16 18	2	39.5	.319	.820	.022	.012	.149
10	16 3	2	27.5	.291	.818	.023	.012	.120
1900 Oct. 11	19 38	3–4	59	388.245	425.861	+0.065	−0.035	814.136
17	20 11	3	43	.248	.845	.066	.036	.123
19	19 49	1–2	41	.207	.866	.067	.036	.104
20	20 19	2–3	43	.217	.863	.067	.036	.111
Assumed Annual Proper Motion and Mean Sum:						−0.084	+0.045	814.126

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	37.496	+0.002	37.527	$+1.0\,x$	$+1.71\,y$	$-0.23\,z$	$= +0.025$	−0.002
C.	.498	− .001	.525	1.0	1.69	0.22	+ .023	− .004
C.	.495	− .001	.522	1.0	1.68	0.22	+ .020	− .007
C.	.514	+ .001	.541	1.0	1.61	0.20	+ .039	+ .013
C.	37.484	−0.002	37.454	$+1.0\,x$	$-1.77\,y$	$+0.22\,z$	$= -0.048$	−0.021
C.	.503	− .001	.473	1.0	1.76	0.23	− .029	− .002
C.	.517	+ .000	.488	1.0	1.75	0.23	− .014	+ .012
C.	.503	+ .000	.472	1.0	1.74	0.24	− .030	− .003
C.	.504	− .000	.472	1.0	1.72	0.25	− .030	− .004
C.	.523	+ .001	.490	1.0	1.72	0.26	− .012	+ .014
C.	.501	− .001	.466	1.0	1.71	0.26	− .036	− .010
C.	.527	+ .000	.492	1.0	1.70	0.27	− .010	+ .016
C.	37.616	−0.000	37.516	$+1.0\,x$	$+1.70\,y$	$+0.77\,z$	$= +0.014$	−0.013
C.	.597	+ .000	.495	1.0	1.64	0.79	− .007	− .033
C.	.659	+ .001	.557	1.0	1.62	0.80	+ .055	+ .029
C.	.646	+ .001	.544	1.0	1.61	0.80	+ .042	+ .016
Assumed Mean Difference:			37.502					

Normals:

			R
$+16.00\,x$	$-0.61\,y$	$+4.25\,z$	$= +0.002$
-0.61	$+46.02$	$+0.36$	$= +0.714$
$+4.25$	$+0.36$	$+3.16$	$= +0.009$

Solution:

	R	R	
x	$= +0.0007$	± 0.0036	Wt. 10.26
y	$= +0.0156$	± 0.0017	45.87
z	$= +0.0000$	± 0.0081	2.02

$[nn] = 0.01479$ $[vv] = 0.00380$ Prob. Error 1 Eq. $= \pm 0''.146$

$\pi = +0''.198 \pm 0''.022$

Weisse 17^h, 322	B. D. $+2°$, 3312	Mag. 8.0	R. A. $17^h\ 18.5^m$	Decl. $+2°\ 17'$	Pos. Angle.
e	$+2°$, 3295	8.6	17 12.3	2 43	$285°.5$
f	$+1°$, 3450	7.2	17 24.2	1 47	$108°.9$

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *e*. R	Distance *f*. R	P. M. Corrections. R	R	Corrected Sum. R
1899 Oct. 12	20 36	3–4	60	455.167	425.666	−0.004	+0.001	880.830
13	20 38	3–4	59	.172	.680	.004	.001	.849
14	20 31	2–3	59	.143	.650	.004	.001	.790
19	21 8	2–3	60	.223	.685	.004	.001	.905
1900 Mar. 25	15 46	1–2	26	455.155	425.657	+0.004	−0.001	880.815
27	15 39	2	30	.173	.668	.004	.001	.844
Apr. 4	14 58	2–3	30	.150	.659	.004	.001	.812
5	15 2	2–3	42	.141	.679	.004	.001	.823
6	14 57	2	40.5	.147	.670	.004	.001	.820
9	15 36	1–2	23	.156	.687	.004	.001	.846
10	14 57	2	29	.109	.652	.004	.001	.764
10	15 28	2	28.5	.153	.642	.004	.001	.798
1900 Oct. 11	20 13	3–4	59	455.207	425.676	+0.012	−0.002	880.895
17	20 43	3	42	.141	.664	.013	.002	.816
19	20 15	1–2	40.5	.144	.688	.013	.002	.843
20	20 47	2–3	42	.149	.663	.013	.002	.823
Assumed Annual Proper-Motion and Mean Sum:						−0.016	+0.003	880.829

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	29.501	−0.000	29.496	$+1.0\,x$	$-1.52\,y$	$-0.22\,z$	$= +0.001$	−0.004
C.	.492	− .001	.486	1.0	1.51	0.22	− .009	− .014
C.	.493	+ .001	.489	1.0	1.49	0.22	− .006	− .011
C.	.538	− .003	.530	1.0	1.42	0.20	+ .035	+ .030
C.	29.498	+0.000	29.503	$+1.0\,x$	$+1.80\,y$	$+0.23\,z$	$= +0.008$	+0.014
C.	.505	− .001	.509	1.0	1.77	0.23	+ .014	+ .020
C.	.491	+ .001	.497	1.0	1.66	0.25	+ .002	+ .008
C.	.462	+ .000	.467	1.0	1.65	0.26	− .028	− .022
C.	.477	+ .000	.482	1.0	1.63	0.26	− .013	− .007
C.	.469	− .001	.473	1.0	1.58	0.27	− .022	− .016
C.	.457	+ .002	.464	1.0	1.56	0.27	− .031	− .025
C.	.511	+ .001	.517	1.0	1.56	0.27	+ .022	+ .027
C.	29.531	−0.002	29.543	$+1.0\,x$	$-1.53\,y$	$+0.77\,z$	$= +0.048$	+0.041
C.	.477	+ .000	.492	1.0	1.45	0.79	− .003	− .009
C.	.456	− .000	.471	1.0	1.42	0.80	− .024	− .030
C.	.486	+ .000	.501	1.0	1.40	0.80	+ .006	+ .000
Assumed Mean Difference:			29.495					

Normals:

			R	*Solution:*	R	R	
$+16.00\,x$	$+1.47\,y$	$+4.34\,z$	$= +0.000$	x	$= -0.0001$	± 0.0048	Wt. 10.04
$+1.47$	$+39.12$	$+0.03$	$= -0.146$	y	$= -0.0037$	± 0.0025	38.92
$+4.34$	$+0.03$	$+3.19$	$= +0.004$	z	$= +0.0014$	± 0.0108	2.01

$[nn] = 0.00741$ $[vv] = 0.00686$ Prob. Error 1 Eq. $= \pm 0''.196$

$\pi = -0''.047 \pm 0''.031$

Weisse 17h, 322 — *Continued.*

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *e*. R		Distance *f*. R	P. M. Corrections. R	R	Corrected Sum. R	Difference. R
1901	Apr.	1	15	3	3	35	455.215	I*	425.683	−0.011	+0.012	880.900	29.532
		1	16	2	3	35	.198	II	.681	.011	.012	.880	.517
		12	14	51	2	39.5	.198	II	.680	.011	.012	.879	.518
		12	16	36	2	38	.212	I	.673	.011	.012	.886	.539
		26	15	15	3	40.5	.192	I	.679	.010	.011	.872	.513
		26	16	27	3	40	.172	II	.689	.010	.011	.862	.483
		27	15	39	3	39.5	.203	II	.672	.010	.011	.876	.531
		27	16	31	3	39.5	.180	I	.717	.010	.011	.898	.463
		28	15	16	3	42	.199	I	.681	.010	.011	.881	.518
		28	16	29	3–4	42	.182	II	.693	.010	.011	.876	.489
1901	Oct.	3	19	51	3–4	51	455.133	II	425.707	−0.004	+0.004	880.840	29.426
		3	20	32	3–4	51	.166	I	.711	.004	.004	.877	.455
		4	19	44	3	47.5	.162	I	.703	.004	.004	.865	.459
		4	20	20	3	47	.145	II	.692	.004	.004	.837	.453
		7	19	44	2	48	.169	II	.707	.004	.004	.876	.462
		7	20	17	2	47.5	.179	I	.690	.004	.004	.869	.489
		11	19	54	2	60.5	.153	II	.704	.003	.004	.858	.449
		11	20	38	3	60	.188	I	.707	.003	.004	.896	.481
		15	20	10	3–4	52.5	.175	I	.707	.003	.003	.882	.468
		15	20	49	3–4	52	.181	II	.690	.003	.003	.871	.491
		16	20	13	3	54	.148	II	.699	.003	.003	.847	.449
		16	20	59	3	54	.183	I	.712	.003	.003	.895	.471
1906	Apr.	2	14	48	2–3	29	455.126	II	425.760	+0.064	−0.068	880.882	29.366
		2	15	24	2–3	28	.085	I	.752	.064	.068	.833	.333
		3	15	12	2	31.5	.132	I	.764	.064	.068	.892	.368
		3	15	45	2	31	.112	II	.762	.064	.068	.870	.350
		13	14	53	3	37	.133	I	.787	.064	.068	.916	.346
		13	15	32	3	37	.122	II	.763	.064	.068	.881	.359
							Assumed Annual Proper Motion and Mean Sum :			−0.015	+0.016	880.872	

Observer.	Scale Value Correction. I R	II R	Corrected Difference. I R	II R	Equations of Condition			I R	II R	Residuals. I R	II R
C.	−0.001	−0.000	29.508	29.494	+1.0 x	+1.71 y	−0.75 z =	+0.033	+0.019	+0.011	+0.002
C.	− .000	− .000	.516	.495	1.0	1.52	0.72	+ .041	+ .020	+ .022	+ .006
C.	+ .000	+ .000	.492	.462	1.0	1.15	0.69	+ .017	− .013	+ .002	− .022
C.	− .001	− .000	.441	.510	1.0	1.12	0.68	− .034	+ .035	− .049	+ .026
C.	− .000	− .000	.497	.468	1.0	1.09	0.68	+ .022	− .007	+ .008	− .015
C.	−0.000	+0.001	29.447	29.419	+1.0 x	−1.64 y	−0.25 z =	−0.028	−0.056	−0.014	−0.028
C.	+ .000	+ .001	.451	.446	1.0	1.63	0.25	− .024	− .029	− .010	− .001
C.	+ .000	− .000	.481	.454	1.0	1.59	0.24	+ .006	− .021	+ .019	+ .006
C.	− .001	+ .001	.473	.443	1.0	1.53	0.23	− .002	− .032	+ .011	− .005
C.	− .000	+ .000	.462	.485	1.0	1.47	0.21	− .013	+ .010	− .001	+ .036
C.	− .001	+ .001	.464	.444	1.0	1.46	0.21	− .011	− .031	+ .001	− .005
C.	+0.001	−0.000	29.466	29.498	+1.0 x	+1.69 y	+4.25 z =	−0.009	+0.023	−0.015	+0.007
C.	− .001	+ .000	.499	.482	1.0	1.68	4.25	+ .024	+ .007	+ .017	− .009
C.	− .001	− .000	.477	.491	1.0	1.49	4.28	+ .002	+ .016	− .002	+ .002
Assumed Mean Difference :			29.475	29.475							

Normals :

			I R	II R		R	R	
+14.00 x	+ 2.13 y	+ 7.87 z	= +0.022	−0.059	(I) x =	+0.0016	± 0.0037	Wt. 12.91
					(II)	+0.0062	± 0.0035	"
+ 2.13	+31.40	+18.21	= +0.266	+0.406	(I) y =	+0.0100	± 0.0027	25.61
					(II)	+0.0134	± 0.0025	"
+ 7.87	+18.21	+57.25	= +0.032	+0.195	(I) z =	−0.0029	± 0.0020	43.55
					(II)	+0.0000	± 0.0019	"

$[nn] = 0.00705$ (I) 0.00954 (II) $\quad [vv] = 0.00440$ (I) 0.00375 (II) $\quad$ Prob. Error 1 Eq. $= \pm 0''.171$ (I) $\pm 0''.158$ (II)

$\pi = +0''.127 \pm 0''.034$ (I) $\qquad \pi = +0''.170 \pm 0''.031$ (II)

* I With screen. II Without screen.

Fed. 2895	B. D. +67°, 1014	Mag. 6.5	R. A. $17^h\ 25.4^m$	Decl. +67° 26′	Pos. Angle.
a	+66°, 1006	8.4	17 15.1	66 49	237°.8
b	+68°, 940	7.9	17 35.1	68 13	48°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr. 1	14 55	2–3	37	333.030	341.010	—0.029	+0.011	674.022
	12	13 3	3	42	.051	.014	.028	.011	.048
	20	13 46	3	45.5	.065	.022	.027	.010	.070
1903	Oct. 18	22 43	3–4	41.5	333.028	341.040	—0.008	+0.003	674.063
	21	23 41	2	45.5	.046	.068	.008	.003	.109
	26	22 53	2–3	32.5	.059	.057	.007	.003	.112
	28	0 3	2–3	31.5	.061	.052	.007	.003	.109
	29	0 7	2–3	47	.054	.081	.007	.003	.131
	Nov. 4	23 58	2	55	.061	.063	.006	.002	.120
1904	Mar. 30	13 9	3	29.5	333.001	341.037	+0.009	—0.004	674.043
	Apr. 3	12 24	3–4	27.5	.009	.019	.010	.004	.034
	4	12 16	3–4	35	.023	.034	.010	.004	.063
					Assumed Annual Proper Motion and Mean Sum:		—0.039	+0.015	674.077

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	7.980	+0.001	8.021	$+1.0\,x$	$-1.88\,y$	$-0.75\,z$	$= +0.009$	+0.014
C.	.963	+ .000	.002	1.0	1.98	0.72	— .010	— .004
C.	.957	+ .000	7.994	1.0	2.00	0.70	— .018	— .012
C.	8.012	+0.000	8.023	$+1.0\,x$	$+1.96\,y$	$-0.21\,z$	$= +0.011$	+0.004
C.	.022	— .000	.033	1.0	1.97	0.20	+ .021	+ .014
C.	7.998	— .000	.008	1.0	1.98	0.18	— .004	— .011
C.	.991	— .000	.001	1.0	1.96	0.18	— .011	— .018
C.	8.027	— .001	.036	1.0	1.95	0.18	+ .024	+ .017
C.	.002	— .001	.009	1.0	1.90	0.16	— .003	— .009
C.	8.036	+0.000	8.023	$+1.0\,x$	$-1.85\,y$	$+0.24\,z$	$= +0.011$	+0.018
C.	.010	+ .000	7.996	1.0	1.91	0.25	— .016	— .009
C.	.011	+ .000	.997	1.0	1.92	0.26	— .015	— .008
	Assumed Mean Difference: 8.012							

Normals:

			R	
$+12.00\,x$	$+0.18\,y$	$-2.53\,z$	$=-0.001$	
$+0.18$	$+45.10$	-0.66	$=+0.154$	
-2.55	-0.66	$+1.96$	$=+0.000$	

Solution:

	R	R	
$x =$	-0.0005	± 0.0033	Wt. 8.72
$y =$	$+0.0034$	± 0.0014	44.76
$z =$	-0.0017	± 0.0082	1.42

$[nn] = 0.00239$ $[vv] = 0.00186$ Prob. Error 1 Eq. $= \pm 0''.123$

$\pi = +0''.043 \pm 0''.018$

Weisse 17^h, 514	B. D. +6°, 3455	Mag. 8.5	R. A. 17^h 27.7^m	Decl. +6° 6′	Pos. Angle.
a	+6°, 3430	8.0	17 22.1	6 16	276°.5
b	+6°, 3494	7.9	17 34.2	6 1	93°.1

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Sept. 27	21	13	3	53.5	398.185	459.448	−0.095	+0.093	857.631
	28	21	13	3	61.5	.210	.461	.095	.093	.669
	29	21	4	2–3	50	.177	.472	.095	.093	.647
1893	Mar. 27	15	12	2	28	398.137	459.478	−0.074	+0.072	857.613
	28	15	18	1–2	20	.142	.462	.074	.072	.602
	29	14	47	1–2	24.5	.140	.452	.074	.072	.590
1896	Mar. 31	15	38	3	38.5	398.017	459.567	+0.052	−0.051	857.585
	Apr. 2	16	22	1–2	26	.002	.573	.053	.051	.577
	5	15	6	3–4	29.5	.029	.583	.053	.051	.614
1897	Aug. 29	20	22	3	64	397.973	459.673	+0.112	−0.109	857.649
	Assumed Annual Proper Motion and Mean Sum:							−0.042	+0.041	857.623

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	61.263	−0.001	61.450	$+1.0x$	$+1.91y$	$-2.26z$	$= -0.015$	−0.010
C.	.251	− .003	.436	1.0	1.90	2.26	= − .029	− .024
C.	.295	− .002	.481	1.0	1.89	2.26	= + .016	+ .021
C.	61.341	+0.001	61.488	$+1.0x$	$-1.89y$	$-1.77z$	$= +0.023$	+0.024
C.	.320	+ .002	.468	1.0	1.88	1.76	= + .003	+ .004
C.	.312	+ .002	.460	1.0	1.87	1.76	= − .005	− .004
C.	61.550	+0.003	61.450	$+1.0x$	$-1.85y$	$+1.24z$	$= -0.015$	−0.015
C.	.571	+ .003	.470	1.0	1.82	1.25	= + .005	+ .005
C.	.554	+ .001	.451	1.0	1.79	1.26	= − .014	− .014
C.	61.700	−0.002	61.477	$+1.0x$	$+1.93y$	$+2.66z$	$= +0.012$	+0.014
	Assumed Mean Difference:		61.465					

Normals:

$$\begin{aligned} +10.00x - 3.47y - 5.66z &= -0.019 \\ -3.47x + 35.08y - 4.63z &= -0.027 \\ -5.66x - 4.63y + 36.43z &= +0.036 \end{aligned}$$

Solution:

	R	R	
$x =$	−0.0019	± 0.0043	Wt. 8.61
$y =$	−0.0009	± 0.0022	32.58
$z =$	+0.0006	± 0.0022	31.94

$[nn] = 0.00247$ $[vv] = 0.00240$ Prob. Error 1 Eq. $= \pm 0''.159$

$\pi = -0''.012 \pm 0''.028$

26 Draconis	B. D. +61°, 1678	Mag. 6.0	R. A. $17^h\ 33.5^m$	Decl. +61° 59′	Pos. Angle.
a	+61°, 1669	8.0	17 30.1	61 48	243°.8
b	+62°, 1561	7.7	17 36.3	62 1	79°.9

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr.	5	14	13	2	29.5	127.007	94.764	−0.004	−0.018	221.749
		18	13	50	1–2	35.5	126.991	.789	.004	.018	.758
		27	12	58	2–3	43.5	127.003	.785	.003	.017	.768
1903	Oct.	13	22	45	3	52.5	126.989	94.798	−0.001	−0.005	221.781
		19	23	0	3	49	127.001	.790	.001	.005	.785
		21	22	59	2	45	126.983	.789	.001	.005	.766
		26	23	27	2–3	32	127.006	.779	.001	.005	.779
		29	23	26	2–3	47.5	.001	.772	.001	.004	.768
	Nov.	1	23	38	–	50	.005	.787	.001	.004	.787
1904	Apr.	4	11	35	3–4	36	126.991	94.748	+0.001	+0.006	221.746
		5	11	57	1–2	43.5	.985	.758	.001	.007	.751
		11	13	33	3	39	127.008	.757	.001	.007	.773
								Assumed Annual Proper Motion and Mean Sum:	−0.005	−0.025	221.768

Observer.	Difference. R	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	32.243	+0.003	32.260	$+1.0\,x$	$+1.94\,y$	$-0.74\,z$	$= +0.035$	+0.023
C.	.202	+ .001	.217	1.0	1.87	0.71	− .008	− .019
C.	.218	+ .000	.232	1.0	1.74	0.68	+ .007	− .003
C.	32.191	−0.002	32.193	$+1.0\,x$	$-1.90\,y$	$-0.22\,z$	$= -0.032$	−0.020
C.	.211	− .002	.213	1.0	1.86	0.20	− .012	− .000
C.	.194	+ .000	.198	1.0	1.85	0.20	− .027	− .015
C.	.227	− .002	.229	1.0	1.81	0.18	+ .004	+ .015
C.	.229	+ .000	.232	1.0	1.77	0.17	+ .007	+ .018
C.	.218	− .003	.218	1.0	1.73	0.17	− .007	+ .004
C.	32.243	+0.003	32.241	$+1.0\,x$	$+1.94\,y$	$+0.26\,z$	$= +0.016$	+0.004
C.	.227	+ .002	.223	1.0	1.94	0.26	− .002	− .013
C.	.251	− .001	.244	1.0	1.92	0.27	+ .019	+ .008
	Assumed Mean Difference: 32.225							

Normals:

			R	
$+12.00\,x$	$+0.43\,y$	$-2.48\,z$	$= +0.000$	
$+0.43$	$+41.39$	-0.35	$= +0.254$	
-2.48	-0.35	$+1.93$	$= -0.002$	

Solution:

	R	R	
$x =$	-0.0003	± 0.0037	Wt. 8.82
$y =$	$+0.0061$	± 0.0017	41.33
$z =$	-0.0003	± 0.0092	1.42

$[nn] = 0.00397$ $[vv] = 0.00241$ Prob. Error 1 Eq. $= \pm 0''.140$

$\pi = +0''.077 \pm 0''.022$

μ Herculis	B. D. +27°, 2888	Mag. 3.5	R. A. $17^h\ 40.8^m$	Decl. +27° 48′	Pos. Angle.
a	+27°, 2877	7.9	17 37.7	27 6	223°.8
b	+28°, 2845	8.2	17 44.6	28 17	60°.1

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr.	12	13	56	3	43	279.780	274.760	−0.057	+0.022	554.505
		19	14	7	2	39	.777	.768	.055	.022	.512
		27	13	39	2–3	43	.773	.783	.054	.021	.523
1903	Sept.	22	21	29	3	63	279.725	274.800	−0.022	+0.009	554.512
		24	21	34	3–4	50	.714	.778	.021	.008	.479
		28	22	25	3–4	46.5	.739	.804	.020	.008	.531
	Oct.	13	22	6	3	53	.732	.787	.017	.007	.509
		19	22	26	3	49.5	.743	.833	.016	.006	.566
		21	22	21	2	44.5	.700	.817	.016	.006	.507
1904	Apr.	4	13	8	3–4	34	279.696	274.815	+0.020	−0.008	554.523
		5	13	23	1–2	41	.702	.777	.021	.008	.492
		13	13	40	2–3	28	.702	.807	.022	.009	.522
								Assumed Annual Proper Motion and Mean Sum:	−0.079	+0.031	554.515

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	5.020	+0.000	4.941	$+1.0\,x$	$+1.77\,y$	$-0.72\,z$ =	+0.028	+0.011
C.	.009	+ .000	.932	1.0	1.78	0.70	+ .019	+ .002
C.	4.990	− .000	.915	1.0	1.77	0.68	+ .002	− .015
C.	4.925	+0.000	4.894	$+1.0\,x$	$-1.59\,y$	$-0.28\,z$ =	−0.019	−0.003
C.	.936	+ .000	.907	1.0	1.61	0.27	− .006	+ .010
C.	.935	− .000	.907	1.0	1.66	0.26	− .006	+ .010
C.	.945	+ .000	.921	1.0	1.77	0.22	+ .008	+ .025
C.	.910	− .000	.888	1.0	1.79	0.20	− .025	− .007
C.	.883	+ .000	.861	1.0	1.79	0.20	− .052	− .034
C.	4.881	−0.000	4.909	$+1.0\,x$	$+1.73\,y$	$+0.26\,z$ =	−0.004	−0.020
C.	.925	+ .000	.954	1.0	1.74	0.26	+ .041	+ .025
C.	.895	− .000	.926	1.0	1.77	0.28	+ .013	− .003
		Assumed Mean Difference:	4.913					

Normals:

			R
$+12.00\,x$	$+0.35\,y$	$-2.73\,z$	$=-0.001$
$+0.35$	$+35.99$	$+0.10$	$=+0.347$
-2.73	$+0.10$	$+2.04$	$=+0.001$

Solution:

	R	R	
x =	−0.0006	± 0.0046	Wt. 8.33
y =	+0.0096	± 0.0022	35.96
z =	−0.0010	± 0.0109	1.42

$[nn] = 0.00684$ $[vv] = 0.00348$ Prob. Error 1 Eq. = ± 0″.168

$\pi = +\,0''.122 \pm 0''.028$

χ Draconis	B. D. +72°, 839	Mag. 3.8	R. A. $18^h\ 23.7^m$	Decl. +72° 40′	Pos. Angle.
a	+72°, 829	7.8	18 11.4	72 7	238°.5
b	+73°, 831	7.0	18 39.0	73 9	65°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Oct. 19	0 25	2–3	49.5	306.027	345.127	+0.002	−0.004	651.152
	27	0 51	3	47	.069	.093	.002	.003	.161
	Nov. 22	0 18	2	36	.039	.106	.001	.002	.144
1895	Apr. 3	13 46	3	29.5	306.039	345.030	−0.003	+0.005	651.071
	21	14 51	2–3	39.5	.049	.066	.003	.006	.118
	23	15 13	2–3	38.5	.078	.076	.003	.006	.157
1896	Mar. 17	14 2	3	21.5	306.048	345.062	−0.013	+0.023	651.120
	Apr. 7	15 46	–	27.5	.042	.024	.014	.024	.076
	30	14 17	3–4	40.5	.085	.063	.015	.025	.158
1897	Sept. 21	21 58	3–4	46.5	306.076	345.048	−0.030	+0.052	651.146
	24	21 55	3–4	53.5	.096	.050	.030	.052	.168
	27	22 38	3–4	44	.079	.028	.030	.052	.129
						Assumed Annual Proper Motion and Mean Sum :	+0.011	−0.019	651.133

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	39.100	−0.001	39.093	$+1.0\,x$	$+1.94\,y$	$-0.20\,z$	$= +0.058$	+0.038
C.	.024	− .002	.017	1.0	1.97	0.18	− .018	− .039
C.	.067	− .001	.063	1.0	1.71	0.11	+ .028	+ .010
C.	38.991	+0.004	39.003	$+1.0\,x$	$-1.87\,y$	$+0.25\,z$	$= -0.032$	−0.019
C.	39.017	+ .001	.027	1.0	1.99	0.30	− .008	+ .006
C.	38.998	− .002	.005	1.0	1.98	0.31	− .030	− .016
C.	39.014	+0.001	39.051	$+1.0\,x$	$-1.60\,y$	$+1.21\,z$	$= +0.016$	+0.029
C.	38.982	+ .003	.023	1.0	1.90	1.26	− .012	+ .004
C.	.978	− .001	.017	1.0	1.95	1.33	− .018	− .001
C.	38.972	−0.001	39.053	$+1.0\,x$	$+1.64\,y$	$+2.72\,z$	$= +0.018$	+0.010
C.	.954	− .001	.035	1.0	1.69	2.73	+ .000	− .008
C.	.949	+ .000	.031	1.0	1.73	2.74	− .004	− .012
		Assumed Mean Difference :	39.035					

Normals :

			R
$+12.00\,x$	$-0.61\,y$	$+12.36\,z$	$= -0.002$
-0.61	$+40.44$	$+4.30$	$= +0.317$
$+12.36$	$+4.30$	$+27.51$	$= -0.013$

Solution : R R

$x = +0.0038 \pm 0.0062$ Wt. 6.29

$y = +0.0083 \pm 0.0025$ 38.78

$z = -0.0035 \pm 0.0041$ 14.21

$[nn] = 0.00753$ $[vv] = 0.00488$ Prob. Error 1 Eq. $= \pm 0.''198$

$$\pi = +0.''105 \pm 0.''032$$

Groom. 2789 pr.	B. D. +49°, 2959	Mag. 6.2	R. A. 19^h 8.3^m	Decl. +49° 35′	Pos. Angle.
a	+49°, 2929	6.3	19 1.4	49 43	275°.2
b	+49°, 2977	6.3	19 14.8	49 18	105°.2

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Nov. 3	0 28	3–4	46	318.818	308.366	−0.002	+0.006	627.188
	12	0 23	3	24.5	.827	.343	.002	.005	.173
	25	0 10	–	31.5	.819	.344	.001	.003	.165
1895	Apr. 3	14 37	3	28.5	318.800	308.349	+0.004	−0.009	627.144
	21	15 28	2–3	38.5	.809	.381	.004	.010	.184
	23	15 49	2–3	38	.807	.371	.005	.011	.172
1896	Mar. 17	14 50	3	21	318.766	308.388	+0.018	−0.042	627.130
	Apr. 7	16 26	–	28.5	.781	.385	.019	.044	.141
	30	15 38	3–4	39	.818	.409	.020	.047	.200
	May 1	15 48	2–3	40	.818	.430	.020	.047	.221
1897	Sept. 21	22 48	3–4	45.5	318.790	308.480	+0.041	−0.095	627.216
	27	23 27	3–4	42.5	.768	.418	.041	.096	.131
	Oct. 18	23 7	3	44.5	.759	.448	.042	.098	.151
							−0.015	+0.035	627.170

Assumed Annual Proper Motion and Mean Sum : −0.015 +0.035 627.170

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	10.452	−0.000	10.444	$+1.0\,x$	$-1.57\,y$	$-0.16\,z$	$= -0.015$	−0.019
C.	.484	− .000	.477	1.0	1.39	0.14	+ .018	+ .014
C.	.475	+ .000	.471	1.0	1.04	0.10	+ .012	+ .009
C.	10.451	+0.000	10.464	$+1.0\,x$	$+1.94\,y$	$+0.25\,z$	$= +0.005$	+0.008
C.	.428	− .000	.442	1.0	1.78	0.30	− .017	− .014
C.	.436	− .000	.452	1.0	1.74	0.31	− .007	− .004
C.	10.378	+0.001	10.439	$+1.0\,x$	$+1.94\,y$	$+1.21\,z$	$= -0.020$	−0.016
C.	.396	+ .000	.459	1.0	1.92	1.26	+ .000	+ .004
C.	.409	− .000	.476	1.0	1.61	1.33	+ .017	+ .020
C.	.388	− .001	.454	1.0	1.59	1.33	− .005	− .002
C.	10.310	−0.001	10.445	$+1.0\,x$	$-1.99\,y$	$+2.72\,z$	$= -0.014$	−0.017
C.	.350	+ .001	.488	1.0	1.98	2.74	+ .029	+ .026
C.	.311	+ .000	.451	1.0	1.83	2.79	− .008	− .011
	Assumed Mean Difference :		10.459					

Normals :

$$\begin{aligned} +13.00\,x + 2.72\,y + 13.84\,z &= -0.005 \\ +2.72\,x + 39.23\,y - 4.84\,z &= -0.078 \\ +13.84\,x - 4.84\,y + 29.59\,z &= +0.003 \end{aligned}$$

Solution :

$$\begin{aligned} x &= +0.0008 \pm 0.0046 \quad \text{Wt. } 5.90 \\ y &= -0.0021 \pm 0.0019 \quad 34.62 \\ z &= -0.0006 \pm 0.0031 \quad 13.25 \end{aligned}$$

$[nn] = 0.00287$ $[vv] = 0.00270$ Prob. Error 1 Eq. $= \pm 0''.141$

$$\pi = -0''.027 \pm 0''.024$$

31 b Aquilae	B. D. +11°, 3833	Mag. 5.5	R. A. $19^h\ 18.1^m$	Decl. +11° 39′	Pos. Angle.
a	+11°, 3802	6.2	19 13.1	11 16	252°.8
b	+12°, 3929	7.5	19 22.8	12 7	68°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct.	15	21	30	2	55	364.937	354.312	+0.133	−0.164	719.218
		16	21	41	–	58.5	.928	.313	.132	.164	.209
		21	21	50	3	50	.955	.329	.132	.163	.253
1893	Mar.	28	16	56	2–3	19.5	364.961	354.260	+0.106	−0.130	719.197
		29	15	31	2–3	24.5	.938	.278	.106	.130	.192
	Apr.	23	16	48	2	36	.973	.265	.102	.125	.215
	May	6	17	5	3	42	.969	.226	.099	.123	.171
		8	16	53	2	45	.956	.274	.099	.122	.207
1897	Mar.	10	15	55	2	28.5	365.186	353.978	−0.131	+0.162	719.195
		30	16	21	2	35.5	.196	.966	.134	.166	.194
		31	16	23	3	30.5	.197	.977	.134	.166	.206
1897	Sept.	30	21	34	2–3	58	365.224	353.949	−0.164	+0.203	719.212
	Oct.	2	21	44	3	43	.244	.942	.165	.204	.225
		4	21	51	2–3	47	.251	.954	.165	.205	.244
			Assumed Annual Proper Motion and Mean Sum:						+0.060	−0.074	719.211

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	10.625	−0.000	10.922	$+1.0\,x$	$-1.93\,y$	$-2.21\,z$	$= +0.000$	+0.002
C.	.615	+ .000	.911	1.0	1.94	2.21	= − .011	− .009
C.	.626	− .001	.920	1.0	1.95	2.20	= − .002	+ .000
C.	10.701	+0.000	10.937	$+1.0\,x$	$+1.82\,y$	$-1.76\,z$	$= +0.015$	+0.012
C.	.660	+ .000	.896	1.0	1.84	1.76	= − .026	− .029
C.	.708	− .000	.935	1.0	1.96	1.69	= + .013	+ .010
C.	.743	+ .000	.965	1.0	1.87	1.66	= + .043	+ .040
C.	.682	+ .000	.903	1.0	1.85	1.65	= − .019	− .022
C.	11.208	+0.000	10.915	$+1.0\,x$	$+1.53\,y$	$+2.19\,z$	$= -0.007$	−0.010
C.	.230	+ .000	.930	1.0	1.85	2.24	= + .008	+ .005
C.	.220	+ .000	.920	1.0	1.86	2.24	= − .002	− .005
C.	11.275	+0.000	10.908	$+1.0\,x$	$-1.82\,y$	$+2.74\,z$	$= -0.014$	−0.012
C.	.302	− .000	.933	1.0	1.84	2.75	= + .011	+ .013
C.	.297	− .001	.926	1.0	1.87	2.76	= + .004	+ .006
	Assumed Mean Difference:		10.922					

Normals:

			R
$+14.00\,x$	$+3.24\,y$	$-0.22\,z$	$= +0.013$
$+3.24$	$+48.18$	-6.62	$= +0.072$
-0.22	-6.62	$+66.67$	$= -0.012$

Solution:

	R	R	
$x =$	$+0.0006$	± 0.0034	Wt. 13.78
$y =$	$+0.0015$	± 0.0018	46.78
$z =$	-0.0000	± 0.0015	65.76

$[nn] = 0.00385$ $\quad [vv] = 0.00374$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.157$

$$\pi = +0''.019 \pm 0''.023$$

Brad. 2459	B. D. +24°, 3737	Mag. 6.1	R. A. 19h 19.4m	Decl. +24° 39′	Pos. Angle.
a	+24°, 3708	7.4	19 12.1	24 9	253°.1
b	+25°, 3864	6.6	19 26.1	25 17	66°.7

Date.		Sid. Time. h.	m.	Def.	Temp.	Distance *a*.	Distance *b*.	P. M. Corrections.		Corrected Sum.
					°	R	R	R	R	R
1893	Nov. 3	23	13	1–2	47	491.323	465.473	−0.043	+0.045	956.798
	6	23	17	3	44.5	.308	.484	.042	.045	.795
	9	23	39	–	43.5	.329	.505	.042	.044	.836
1894	Apr. 6	16	11	–	29	491.285	465.477	−0.027	+0.029	956.764
	9	16	4	3	32.5	.271	.462	.027	.028	.734
	14	16	26	2–3	39	.274	.471	.027	.028	.746
1897	Mar. 15	16	3	2–3	21.5	491.166	465.566	+0.081	−0.086	956.727
	26	16	9	2–3	26	.173	.597	.083	.087	.766
	Apr. 18	16	14	2	41.5	.198	.605	.085	.089	.799
1897	Oct. 5	22	26	1–2	48	491.156	465.641	+0.102	−0.108	956.791
	10	22	30	2	40.5	.164	.625	.102	.108	.783
	23	22	51	3–4	43.5	.169	.647	.103	.108	.811
						Assumed Annual Proper Motion and Mean Sum:		−0.037	+0.039	956.779

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	25.850	−0.000	25.762	$+1.0\,x$	$-1.93\,y$	$-1.16\,z$	$= +0.013$	+0.021
C.	.824	− .000	.737	1.0	1.91	1.15	− .012	− .004
C.	.824	− .002	.736	1.0	1.88	1.14	− .013	− .005
C.	25.808	+0.000	25.752	$+1.0\,x$	$+1.89\,y$	$-0.74\,z$	$= +0.003$	−0.005
C.	.809	+ .001	.755	1.0	1.92	0.73	+ .006	− .002
C.	.803	+ .001	.749	1.0	1.96	0.72	+ .000	− .008
C.	25.600	+0.001	25.768	$+1.0\,x$	$+1.55\,y$	$+2.20\,z$	$= +0.019$	+0.015
C.	.576	+ .000	.746	1.0	1.75	2.23	− .003	− .009
C.	.593	− .001	.766	1.0	1.98	2.29	+ .017	+ .010
C.	25.515	−0.000	25.725	$+1.0\,x$	$-1.86\,y$	$+2.76\,z$	$= -0.024$	−0.015
C.	.539	− .000	.749	1.0	1.90	2.77	+ .000	+ .010
C.	.522	− .001	.732	1.0	1.94	2.81	− .017	− .007
	Assumed Mean Difference:		25.749					

Normals:

			R_{zz}
$+12.00\,x$	$-0.37\,y$	$+9.42\,z$	$= -0.011$
-0.37	$+42.21$	-1.63	$= +0.176$
$+9.42$	-1.63	$+43.81$	$= -0.032$

Solution:

	R	R	
$x =$	-0.0004	± 0.0026	Wt. 9.96
$y =$	$+0.0041$	± 0.0013	42.15
$z =$	$+0.0005$	± 0.0014	36.35

$[nn] = 0.00205$ $[vv] = 0.00133$ Prob. Error 1 Eq. $= \pm 0''.104$

$\pi = +0''.052 \pm 0''.016$

β^1 Cygni	B. D. +27°, 3410	Mag. 3.0	R. A. 19^h 24.9^m	Decl. +27° 39′	Pos. Angle.
a	+27°, 3379	7.0	19 18.6	27 48	275°.7
a′	+27°, 3391	7.8	19 20.7	27 2	235°.8
b′	+28°, 3392	8.1	19 28.4	28 6	59°.9
b	+27°, 3444	7.8	19 30.8	27 33	94°.0

Date.			Sid. Time. h.	m.	Def.	Temp.	Distance *a*.	Distance *a′*.	Distance *b′*.	Distance *b*.	P. M. Corrections.			
						°	R	R	R	R	R	R	R	R
1893	May	9	15	29	1–2	47	399.201	319.055	252.727	376.094	0.000	−0.062	0.000	0.000
		11	15	27	2–3	54.5	.188	.061	.722	.095	.000	.062	.000	.000
		18	15	25	2–3	48	.202	.017	.690	.065	.000	.062	.000	.000
		19	15	11	2	46.5	.224	.050	.695	.081	.000	.062	.000	.000
		29	15	47	2–3	52.5	.214	.036	.737	.069	.000	.061	.000	.000
	June	5	17	7	–	68	.200	.057	.686	.094	.000	.061	.000	.000
1893	Oct.	2	23	1	3	55	399.185	319.067	252.712	376.051	0.000	−0.058	0.000	0.000
		5	22	29	2	54.5	.210	.038	.717	.065	.000	.058	.000	.000
		7	22	44	2–3	55.5	.194	.049	.739	.058	.000	.058	.000	.000
		8	23	4	3	55.5	.199	.074	.678	.104	.000	.058	.000	.000
		9	23	1	3–4	62	.192	.053	.718	.075	.000	.058	.000	.000
		10	22	54	3	51.5	.189	.051	.727	.060	.000	.058	.000	.000
1905	Oct.	30	23	37	2–3	37	399.197	318.945	252.736	376.102	0.000	+0.075	0.000	0.000
	Nov.	1	23	52	2–3	36	.183	.902	.750	.072	.000	.075	.000	.000
		2	23	59	2–3	31	.188	.897	.710	.115	.000	.075	.000	.000
		6	23	59	3–4	48	.198	.879	.735	.050	.000	.075	.000	.000
											Assumed Annual Proper Motion :	0.000	−0.011	0.000	0.000

Observer.	Corrected Sum. $\frac{1}{2}(a+a')+\frac{1}{2}(b'+b)$.	Difference. $\frac{1}{2}(a+a')-\frac{1}{2}(b'+b)$.	Scale Value Correction.	Corrected Difference.	Equations of Condition.			Residuals.
	R	R	R	R				R	R
C.	673.507	44.717	−0.001	44.685	+1.0 x	+1.80 y	−5.65 z =	−0.010	−0.012
C.	.502	.716	− .001	.684	1.0	1.78	5.64	− .011	− .013
C.	.456	.732	+ .002	.703	1.0	1.69	5.62	+ .008	+ .006
C.	.494	.749	− .000	.718	1.0	1.67	5.62	+ .023	+ .021
C.	.497	.722	− .000	.691	1.0	1.49	5.59	− .004	− .006
C.	.487	.738	+ .000	.707	1.0	1.34	5.58	+ .012	+ .009
C.	673.478	44.744	+0.001	44.716	+1.0 x	−1.77 y	−5.25 z =	+0.021	+0.012
C.	.486	.733	+ .000	.704	1.0	1.80	5.24	+ .009	+ .000
C.	.491	.723	− .000	.694	1.0	1.82	5.24	− .001	− .010
C.	.498	.745	− .000	.716	1.0	1.83	5.23	+ .021	+ .012
C.	.490	.726	+ .000	.697	1.0	1.84	5.23	+ .002	− .007
C.	.484	.726	+ .000	.697	1.0	1.85	5.23	+ .002	− .007
C.	673.527	44.652	−0.002	44.687	+1.0 x	−1.84 y	+6.83 z =	−0.008	+0.009
C.	.490	.631	+ .000	.668	1.0	1.83	6.83	− .027	− .010
C.	.492	.630	− .000	.667	1.0	1.82	6.83	− .028	− .011
C.	.468	.646	+ .001	.684	1.0	1.79	6.85	− .011	+ .006
	Mean : 673.490	Assumed Mean Difference :		44.695					

R

Normals : $+16.00\,x - 8.42\,y - 37.78\,z = -0.002$
$-8.42 + 49.15 - 47.48 = +0.061$
$-37.78 - 47.48 + 540.68 = -0.889$

R R

Solution : $x = -0.0064 \pm 0.0024$ Wt. 10.30
$y = -0.0021 \pm 0.0013$ 34.68
$z = -0.0022 \pm 0.0004$ 350.00

$[nn] = 0.00364$ $[vv] = 0.00172$ Prob. Error 1 Eq. $= \pm$ 0″.099

$\pi = -$0″.027 $\pm$ 0″.017

β^2 Cygni	B. D. +27°, 3411	Mag. 6.5	R. A. $19^h\ 24.9^m$	Decl. +27° 40′	Pos. Angle.
a	+27°, 3379	7.0	19 18.6	27 48	275°.7
a'	+27°, 3391	7.8	19 20.7	27 2	235°.8
b'	+28°, 3392	8.1	19 28.4	28 6	59°.9
b	+27 , 3444	7.8	19 30.8	27 33	94°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance a. R	Distance a'. R	Distance b'. R	Distance b. R	P. M. Corrections. R	R	R	R
1893	May	9	16	11	1–2	47	401.273	321.779	250.028	373.968	0.000	—0.062	0.000	0.000
		11	15	26	2–3	54.5	.273	.781	.079	.965	.000	.062	.000	.000
		18	15	25	2–3	48	.241	.746	.006	.957	.000	.062	.000	.000
		19	15	11	2	46.5	.262	.774	.011	.937	.000	.062	.000	.000
		29	15	47	2–3	52.5	.239	.755	.028	.962	.000	.061	.000	.000
	June	5	17	7	–	68	.262	.754	249.996	.950	.000	.061	.000	.000
1893	Oct.	2	23	1	3	55	401.253	321.740	250.018	373.908	0.000	—0.058	0.000	0.000
		5	22	29	2	54.5	.247	.765	.010	.952	.000	.058	.000	.000
		7	22	44	2–3	55.5	.242	.772	.032	.929	.000	.058	.000	.000
		8	23	4	3	55.5	.244	.750	249.996	.970	.000	.058	.000	.000
		9	23	1	3–4	62	.246	.772	250.017	.936	.000	.058	.000	.000
		10	22	54	3	51.5	.247	.768	.033	.935	.000	.058	.000	.000
1905	Oct.	30	23	37	2–3	37	401.275	321.645	250.017	373.940	0.000	+0.075	0.000	0.000
	Nov.	1	23	53	2–3	36	.253	.608	249.990	.942	.000	.075	.000	.000
		2	23	59	2–3	31	.261	.637	250.013	.948	.000	.075	.000	.000
		6	23	59	3–4	48	.231	.623	.011	.935	.000	.075	.000	.000
											Assumed Annual Proper Motion:	0.000	—0.011	0.000	0.000

Observer.	Corrected Sum. $\frac{1}{2}(a+a')+\frac{1}{2}(b'+b)$. R	Difference. $\frac{1}{2}(a+a')-\frac{1}{2}(b'+b)$. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	673.493	49.528	—0.002	49.495	$+1.0\,x$	$+1.80\,y$	$-5.65\,z$ =	+0.000	+0.009
C.	.508	.505	— .004	.470	1.0	1.78	5.64	— .025	— .017
C.	.444	.512	+ .001	.482	1.0	1.69	5.62	— .013	— .006
C.	.461	.544	— .000	.513	1.0	1.67	5.62	+ .018	+ .025
C.	.461	.502	— .000	.471	1.0	1.49	5.59	— .024	— .017
C.	.450	.535	+ .001	.505	1.0	1.34	5.58	+ .010	+ .017
C.	673.430	49.533	+0.002	49.506	$+1.0\,x$	$-1.77\,y$	$-5.25\,z$ =	+0.011	+0.011
C.	.458	.525	+ .000	.496	1.0	1.80	5.24	+ .001	+ .001
C.	.458	.526	+ .000	.497	1.0	1.82	5.24	+ .002	+ .002
C.	.451	.514	+ .001	.486	1.0	1.83	5.23	— .009	— .009
C.	.456	.532	+ .000	.503	1.0	1.84	5.23	+ .008	+ .007
C.	.462	.523	— .000	.494	1.0	1.85	5.23	— .001	— .001
C.	673.475	49.481	—0.001	49.517	$+1.0\,x$	$-1.84\,y$	$+6.83\,z$ =	+0.022	+0.014
C.	.433	.464	+ .002	.503	1.0	1.83	6.83	+ .008	+ .000
C.	.466	.468	— .000	.505	1.0	1.82	6.83	+ .010	+ .002
C.	.437	.454	+ .002	.493	1.0	1.79	6.85	— .002	— .010
Mean:	673.459	Assumed Mean Difference:		49.495					

Normals:

			R
$+16.00\,x$	$-8.42\,y$	$-37.78\,z$	$=+0.016$
-8.42	$+49.15$	-47.48	$=-0.148$
-37.78	-47.48	$+540.68$	$=+0.388$

Solution:

	R	R	
x =	−0.0004	± 0.0027	Wt. 10.30
y =	−0.0022	± 0.0015	34.68
z =	+0.0006	± 0.0005	350.00

$[nn] = 0.00272$ $[vv] = 0.00213$ Prob. Error 1 Eq. = ± 0″.109

$\pi = -0''.028 \pm 0''.018$

Groom. 2875	B. D. +58°, 1929	Mag. 6.4	R. A. $19^h\ 28.7^m$	Decl. +58° 18′	Pos. Angle.
a	+58°, 1917	8.4	19 25.0	58 19	274°.1
b	+58°, 1948	8.3	19 35.4	58 12	95°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Nov. 3	23 47	3–4	46.5	139.702	252.890	−0.009	+0.006	392.589
	12	23 50	3	25	.737	.871	.008	.006	.606
	29	0 51	3–4	19	.688	.899	.005	.004	.586
1895	Apr. 3	15 14	3	27.5	139.670	252.899	+0.013	−0.010	392.572
	19	16 39	1–2	44	.711	.931	.016	.012	.646
	May 13	15 33	2–3	36	.695	.926	.019	.014	.626
1896	Mar. 17	15 30	3	20.5	139.638	252.944	+0.065	−0.048	392.599
	Apr. 30	14 50	3–4	39.5	.652	.945	.072	.053	.616
	May 1	15 9	2–3	40	.581	.969	.072	.053	.569
1897	Sept. 21	23 35	3–4	45	139.596	252.995	+0.147	−0.109	392.629
	24	22 37	3–4	53.5	.548	253.025	.147	.109	.611
	Oct. 18	23 42	3	43.5	.556	252.999	.150	.112	.593
					Assumed Annual Proper Motion and Mean Sum:		−0.054	+0.040	392.604

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	113.188	+0.004	113.207	$+1.0\,x$	$+1.73\,y$	$-0.16\,z$	= +0.012	+0.019
C.	.134	− .001	.147	1.0	1.58	0.14	− .048	− .041
C.	.211	+ .005	.225	1.0	1.17	0.09	+ .030	+ .035
C.	113.229	+0.009	113.215	$+1.0\,x$	$-1.97\,y$	$+0.25\,z$	= +0.020	+0.010
C.	.220	− .012	.180	1.0	1.90	0.30	− .015	− .025
C.	.231	− .006	.192	1.0	1.55	0.36	− .003	− .011
C.	113.306	+0.001	113.194	$+1.0\,x$	$-1.85\,y$	$+1.21\,z$	= −0.001	−0.009
C.	.293	− .003	.165	1.0	1.77	1.33	− .030	− .038
C.	.388	+ .010	.273	1.0	1.75	1.33	+ .078	+ .070
C.	113.399	−0.007	113.136	$+1.0\,x$	$+1.88\,y$	$+2.72\,z$	= −0.059	−0.047
C.	.477	− .002	.219	1.0	1.90	2.73	+ .024	+ .036
C.	.443	+ .003	.184	1.0	1.92	2.79	− .011	+ .002
	Assumed Mean Difference:		113.195					

Normals:

			R
$+12.00\,x$	$-0.61\,y$	$+12.63\,z$	$= -0.003$
-0.61	$+37.21$	$+6.51$	$= -0.194$
$+12.63$	$+6.51$	$+27.97$	$= -0.060$

Solution:

	R	R	
$x =$	+0.0010	± 0.0104	Wt. 5.94
$y =$	−0.0049	± 0.0044	33.67
$z =$	−0.0015	± 0.0070	13.25

$[nn] = 0.01514$ $\quad [vv] = 0.01411$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.322$

$$\pi = -0''.062 \pm 0''.055$$

Lal. 37120–1	B. D. +32°, 3474	Mag. 7.0	R. A. $19^h\ 28.0^m$	Decl. +32° 53′	Pos. Angle.
a	+32°, 3434	8.0	19 21.1	32 3	240°.1
b	+33°, 3547	6.5	19 34.3	33 38	59°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893 Nov. 10	0 19	3	30.5	475.063	430.350	—0.024	+0.023	905.412
20	23 51	2–3	28.5	.073	.367	.024	.022	.438
1894 Apr. 6	16 53	–	27.5	475.016	430.323	—0.016	+0.015	905.338
15	16 0	3	35.5	.038	.330	.015	.014	.367
27	16 17	3	53	.035	.327	.014	.014	.362
1897 Mar. 15	15 28	2–3	22	475.000	430.427	+0.046	—0.044	905.429
26	14 44	2–3	29	474.974	.393	.047	.045	.369
Apr. 15	17 1	2	36.5	.981	.395	.048	.046	.378
1897 Oct. 5	22 58	1–2	48	474.974	430.415	+0.058	—0.055	905.392
10	23 1	2	40.5	.967	.423	.058	.055	.393
Nov. 18	22 46	3	29.5	.959	.421	.059	.056	.383
Assumed Annual Proper Motion and Mean Sum:						—0.021	+0.020	905.390

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	44.713	—0.001	44.665	$+1.0\,x$	$-1.91\,y$	$-1.14\,z$	$= -0.002$	+0.004
C.	.706	— .002	.658	1.0	1.85	1.12	— .009	— .003
C.	44.693	+0.003	44.665	$+1.0\,x$	$+1.75\,y$	$-0.74\,z$	$= -0.002$	—0.010
C.	.708	+ .001	.680	1.0	1.85	0.72	+ .013	+ .005
C.	.708	+ .001	.681	1.0	1.95	0.68	+ .014	+ .005
C.	44.573	—0.002	44.661	$+1.0\,x$	$+1.27\,y$	$+2.20\,z$	$= -0.006$	—0.011
C.	.581	+ .001	.674	1.0	1.54	2.23	+ .007	+ .001
C.	.586	+ .001	.681	1.0	1.85	2.28	+ .014	+ .007
C.	44.559	—0.000	44.672	$+1.0\,x$	$-1.66\,y$	$+2.76\,z$	$= +0.005$	+0.012
C.	.544	— .000	.657	1.0	1.72	2.77	— .010	— .003
C.	.538	+ .000	.653	1.0	1.87	2.88	— .014	— .006
Assumed Mean Difference:	44.667							

Normals:

$$+11.00\,x + 1.20\,y + 10.72\,z = +0.010$$
$$+1.20 + 33.97 - 3.99 = +0.132$$
$$+10.72 - 3.99 + 42.67 = -0.025$$

Solution:

	R	R	
$x =$	+0.0009	± 0.0019	Wt. 8.17
$y =$	+0.0038	± 0.0010	33.01
$z =$	−0.0005	± 0.0010	31.45

$[nn] = 0.00105$ $[vv] = 0.00053$ Prob. Error 1 Eq. = ± 0.″070

$\pi = +0.″048 \pm 0.″012$

θ Cygni	B. D. +49°, 3062	Mag. 4.9	R. A. $19^h\ 32.6^m$	Decl. +49° 53′	Pos. Angle.
a	+49°, 3023	8.0	19 26.0	49 12	236°.9
b	+50°, 2863	8.0	19 40.2	50 34	61°.3

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	May	4	16	27	2	47·5	359·519	395·321	0.000	0.000	754.840
		5	15	6	3	40	·536	·334	.000	.000	.870
		7	15	24	2	54	·512	·312	.000	.000	.824
	June	3	15	43	2–3	58·5	·520	·348	.000	.000	.868
1901	Oct.	8	0	15	2–3	51·5	359·519	395·347	0.000	0.000	754.866
		26	23	56	2–3	49	·520	·355	.000	.000	.875
		28	23	42	2	43·5	·519	·339	.000	.000	.858
		29	0	9	2	41·5	·519	·344	.000	.000	.863
	Nov.	4	23	44	3–4	42·5	·484	·334	.000	.000	.818
		6	0	51	3	35·5	·511	·357	.000	.000	.868
1902	Apr.	27	14	54	3–4	43·5	359·481	395·304	0.000	0.000	754.785
		28	14	34	3–4	51	·508	·314	.000	.000	.822
		30	14	58	3–4	54·5	·498	·329	.000	.000	.827
	May	3	15	18	2	45	·490	·316	.000	.000	.806
							Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	754.842

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	35.802	+0.000	35.802	$+1.0\,x$	$-2.01\,y$	$-0.66\,z$	$= -0.021$	−0.003
C.	.798	− .001	.797	1.0	2.02	0.65	= − .026	− .008
C.	.800	+ .001	.801	1.0	2.03	0.65	= − .022	− .004
C.	.828	− .001	.827	1.0	1.88	0.58	= + .004	+ .019
C.	35.828	−0.001	35.827	$+1.0\,x$	$+1.64\,y$	$-0.23\,z$	$= +0.004$	−0.004
C.	.835	− .002	.833	1.0	1.89	0.18	= + .010	− .000
C.	.820	− .001	.819	1.0	1.90	0.18	= − .004	− .015
C.	.825	− .001	.824	1.0	1.91	0.18	= + .001	− .010
C.	.850	+ .001	.851	1.0	1.95	0.16	= + .028	+ .017
C.	.846	− .001	.845	1.0	1.97	0.15	= + .022	+ .011
C.	35.823	+0.003	35.826	$+1.0\,x$	$-1.97\,y$	$+0.32\,z$	$= +0.003$	+0.002
C.	.806	+ .001	.807	1.0	1.97	0.32	= − .016	− .017
C.	.831	+ .001	.832	1.0	1.99	0.33	= + .009	+ .008
C.	.826	+ .002	.828	1.0	2.00	0.33	= + .005	+ .004
	Assumed Mean Difference:		35.823					

Normals:

$$+14.00\,x - 4.61\,y - 2.32\,z = -0.003$$
$$-4.61 + 52.69 + 0.46 = +0.248$$
$$-2.32 + 0.46 + 2.24 = +0.033$$

Solution:

	R	R	
$x =$	+0.0045	± 0.0024	Wt. 11.26
$y =$	+0.0049	± 0.0011	51.12
$z =$	+0.0018	± 0.0058	1.86

$[nn] = 0.00339$ $\quad [vv] = 0.00157$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.102$

$$\pi = +0''.062 \pm 0''.014$$

Groom. 2909	B. D. +45°, 2949	Mag. 5.5	R. A. 19h 36.4m	Decl. +45° 11′	Pos. Angle.
a	+45°, 2927	8.3	19 31.1	45 7	265.°4
b	+45°, 2971	7.2	19 41.8	45 23	78.°0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	May	4	15	39	1–2	48	266.106	278.139	0.000	0.000	544.245
		5	15	47	3	39.5	.101	.156	.000	.000	.257
		15	15	46	2	55	.117	.138	.000	.000	.255
	June	5	16	3	2	63.5	.116	.142	.000	.000	.258
1901	Oct.	10	23	50	3	57.5	266.120	278.158	0.000	0.000	544.278
		26	23	13	2–3	49.5	.122	.125	.000	.000	.247
		28	23	2	2	45.5	.112	.135	.000	.000	.247
		29	23	27	2	42.5	.120	.131	.000	.000	.251
	Nov.	2	0	20	2–3	43.5	.120	.140	.000	.000	.260
		6	0	4	3	36.5	.088	.115	.000	.000	.203
1902	Apr.	27	15	38	3–4	43	266.121	278.122	0.000	0.000	544.243
		28	15	25	3	50	.116	.133	.000	.000	.249
	May	1	14	37	2	49	.101	.118	.000	.000	.219
		3	14	38	2	45.5	.102	.110	.000	.000	.212
								Assumed Annual Proper Motion and Mean Sum:	0.000	0.000	544.245

Observer.	Difference. K	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	12.033	+0.000	12.033	+1.0 x	−1.92 y	−0.66 z =	+0.012	−0.002
C.	.055	− .000	.055	1.0	1.91	0.66	+ .034	+ .020
C.	.021	− .000	.021	1.0	1.81	0.63	+ .000	− .013
C.	.026	− .000	.026	1.0	1.42	0.58	+ .005	− .007
C.	12.038	−0.001	12.037	+1.0 x	+1.93 y	−0.23 z =	+0.016	+0.016
C.	.003	− .000	.003	1.0	1.95	0.18	− .018	− .017
C.	.023	− .000	.023	1.0	1.94	0.18	+ .002	+ .003
C.	.011	− .000	.011	1.0	1.93	0.18	− .010	− .009
C.	.020	− .000	.020	1.0	1.91	0.16	− .001	+ .000
C.	.027	+ .001	.028	1.0	1.88	0.15	+ .007	+ .008
C.	12.001	+0.000	12.001	+1.0 x	−1.97 y	+0.32 z =	−0.020	−0.010
C.	.017	− .000	.017	1.0	1.97	0.32	− .004	+ .006
C.	.017	+ .001	.018	1.0	1.94	0.33	− .003	+ .007
C.	.008	+ .001	.009	1.0	1.93	0.33	− .012	− .002
			Assumed Mean Difference:	12.021				

R

Normals: $+14.00\,x - 3.33\,y - 2.31\,z = +0.008$
$-3.33 + 50.06 - 0.12 = -0.027$
$-2.31 - 0.12 + 2.22 = -0.046$

R R

Solution: $x = -0.0036 \pm 0.0023$ Wt. 11.36
$y = -0.0008 \pm 0.0011$ 49.03
$z = -0.0024 \pm 0.0057$ 1.83

$[nn] = 0.00263$ $[vv] = 0.00151$ Prob. Error 1 Eq. $= \pm 0.''101$

$\pi = -0.''010 \pm 0.''014$

χ Cygni	B. D. +33°, 3587	Mag. 5.4	R. A. $19^h\ 40.9^m$	Decl. +33° 24′	Pos. Angle.
a	+33°, 3539	7.8	19 33.3	33 1	256°.6
b	+33°, 3633	7.7	19 47.3	33 49	71°.9

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Nov. 3	23	52	1–2	46	462.714	395.630	—0.006	+0.012	858.350
	6	0	7	3	44	.749	.600	.006	.011	.354
	16	0	9	3	31	.721	.591	.006	.011	.317
1894	Apr. 15	16	42	2–3	35.5	462.712	395.593	—0.004	+0.007	858.308
	17	16	28	2	37	.685	.568	.004	.007	.256
	27	17	3	3	53	.672	.597	.003	.007	.273
1897	Mar. 15	14	36	2–3	22.5	462.693	395.610	+0.011	—0.022	858.292
	26	15	31	2–3	28	.674	.593	.011	.022	.256
	Apr. 15	16	22	2	6.5	.695	.623	.011	.022	.307
1897	Oct. 5	23	32	1–2	47.5	462.690	395.639	+0.014	—0.028	858.315
	23	23	25	3–4	42.5	.718	.670	.014	.028	.374
	Nov. 18	23	24	3	29	.683	.651	.014	.028	.320
	Assumed Annual Proper Motion and Mean Sum:							—0.005	+0.010	858.310

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	67.084	—0.003	67.063	$+1.0\,x$	$-1.95\,y$	$-1.16\,z$ =	—0.035	—0.031
C.	.149	— .003	.129	1.0	1.94	1.15	+ .031	+ .035
C.	.130	— .001	.112	1.0	1.84	1.13	+ .014	+ .017
C.	67.119	+0.000	67.108	$+1.0\,x$	$+1.95\,y$	$-0.72\,z$ =	+0.010	+0.003
C.	.117	+ .004	.110	1.0	1.97	0.71	+ .012	+ .005
C.	.075	+ .003	.068	1.0	2.00	0.68	— .030	— .037
C.	67.083	+0.001	67.117	$+1.0\,x$	$+1.49\,y$	$+2.20\,z$ =	+0.019	+0.015
C.	.081	+ .004	.118	1.0	1.70	2.23	+ .020	+ .016
C.	.072	+ .000	.105	1.0	1.95	2.28	+ .007	+ .002
C.	67.051	—0.000	67.093	$+1.0\,x$	$-1.81\,y$	$+2.76\,z$ =	—0.005	+0.001
C.	.048	— .005	.085	1.0	1.96	2.81	— .013	— .006
C.	.032	— .001	.073	1.0	1.81	2.88	— .025	— .019
	Assumed Mean Difference:		67.098					

Normals:

			R
$+12.00\,x$	$-0.25\,y$	$+9.61\,z$ =	+0.005
-0.25	$+41.94$	-1.79 =	+0.120
$+9.61$	-1.79	$+44.25$ =	—0.027

Solution:

	R	R	
x =	+0.0011	± 0.0049	Wt. 9.90
y =	+0.0028	± 0.0024	41.87
z =	—0.0007	± 0.0026	36.45

$[nn] = 0.00515$ $[vv] = 0.00479$ Prob. Error 1 Eq. = ± 0″.197

$\pi = +\,0''.036 \pm 0''.030$

χ Cygni	B. D. + 33°, 3587	Mag. 5.4	R. A. $19^h\ 40.9^m$	Decl. +33° 24′	Pos. Angle.
a	+ 33°, 3550	8.5	19 34.6	33 1	254°.4
b	+ 33°, 3633	7.7	19 47.3	33 49	71°.9

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	May 5	16	41	2–3	44	390.291	395.797	0.000	0.000	786.088
	12	15	45	4	53	.351	.785	.000	.000	.136
	16	16	38	3	52	.327	.737	.000	.000	.064
	31	15	36	3	52	.377	.753	.000	.000	.130
1901	Nov. 19	23	21	3	32	390.347	395.797	0.000	0.000	786.144
	20	22	51	3	32	.294	.735	.000	.000	.029
	21	22	42	2	35	.299	.766	.000	.000	.065
	27	23	1	4	23	.321	.735	.000	.000	.056
	28	22	41	3	19	.294	.756	.000	.000	.050
	Dec. 1	23	1	–	39	.332	.783	.000	.000	.115
1902	Apr. 22	15	45	3–4	52	390.309	395.800	0.000	0.000	786.109
	24	15	37	3–4	44	.310	.766	.000	.000	.076
	27	16	27	2–3	44	.313	.761	.000	.000	.074
	28	16	36	3	51	.312	.772	.000	.000	.084
							Assumed Annual Proper Motion and Mean Sum :	0.000	0.000	786.087

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	5.506	—0.000	5.506	+1.0 x	−1.98 y	−0.66 z =	+0.060	+0.074
S.	.434	— .000	.434	1.0	1.94	0.64	— .012	+ .001
S.	.410	+ .000	.410	1.0	1.91	0.63	— .036	— .023
S.	.376	— .000	.376	1.0	1.70	0.59	— .070	— .058
S.	5.450	—0.000	5.450	+1.0 x	+1.84 y	−0.12 z =	+0.004	+0.004
S.	.441	+ .000	.441	1.0	1.84	0.11	— .005	— .005
S.	.467	+ .000	.467	1.0	1.83	0.11	+ .021	+ .021
S.	.414	+ .000	.414	1.0	1.72	0.09	— .032	— .033
S.	.462	+ .000	.462	1.0	1.70	0.09	+ .016	+ .015
S.	.451	— .000	.451	1.0	1.63	0.08	+ .005	+ .004
S.	5.491	—0.000	5.491	+1.0 x	−2.00 y	+0.31 z =	+0.045	+0.028
S.	.456	+ .000	.456	1.0	2.00	0.31	+ .010	— .007
S.	.448	+ .000	.448	1.0	2.00	0.32	+ .002	— .016
S.	.460	+ .000	.460	1.0	2.00	0.32	+ .014	— .004
	Assumed Mean Difference :		5.446					

Normals :

			R
+ 14.00 x	− 4.97 y	− 1.86 z =	+ 0.022
− 4.97	+ 48.85	+ 1.17 =	− 0.034
− 1.86	+ 1.17	+ 2.06 =	+ 0.055

Solution :

	R	R	
x =	+ 0.0056	± 0.0065	Wt. 12.0
y =	− 0.0009	± 0.0033	46.9
z =	+ 0.0321	± 0.0167	1.8

$[nn] = 0.01404$ $[vv] = 0.01227$ Prob. Error 1 Eq. = ± 0″.286

$\pi = -0''.011 \pm 0''.042$

Lal. 38287	B. D. +15°, 4026	Mag. 7.0	R. A. $19^h\ 56.0^m$	Decl. +15° 14′	Pos. Angle.
a	+14°, 4096	7.0	19 49.3	14 40	251°.0
b	+16°, 4153	6.5	20 1.5	16 15	52°.0

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Nov. 10	23	41	3	30	478.563	480.845	—0.026	+0.051	959.433
	11	23	35	3	39	.529	.833	.026	.051	.387
	18	23	48	3	36	.549	.844	.026	.051	.418
1894	Apr. 9	17	18	3	32	478.524	480.806	—0.017	+0.033	959.346
	15	17	19	2–3	35.5	.487	.829	.017	.032	.331
	17	17	32	2	36.5	.521	.846	.016	.032	.383
1895	May 28	16	33	3–4	54.5	478.513	480.915	+0.009	—0.018	959.419
	June 1	17	56	3	74	.542	.896	.009	.018	.429
	16	17	37	3–4	53.5	.530	.903	.010	.020	.423
1895	Nov. 1	23	11	1	36.5	478.456	480.901	+0.019	—0.037	959.339
	11	23	56	3	28.5	.478	.901	.020	.039	.360
	30	23	10	2–3	33.5	.441	.916	.021	.041	.337
	Assumed Annual Proper Motion and Mean Sum:							—0.023	+0.045	959.384

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	2.282	—0.000	2.359	$+1.0\,x$	$+1.90\,y$	$-1.14\,z$ =	—0.008	—0.017
C.	.304	— .000	.381	1.0	1.90	1.14	+ .014	+ .005
C.	.295	— .000	.372	1.0	1.86	1.12	+ .005	— .004
C.	2.282	+0.000	2.332	$+1.0\,x$	$-1.78\,y$	$-0.73\,z$ =	—0.035	—0.023
C.	.342	+ .000	.391	1.0	1.85	0.72	+ .024	+ .036
C.	.325	+ .000	.373	1.0	1.87	0.71	+ .006	+ .018
C.	2.402	—0.000	2.375	$+1.0\,x$	$-1.80\,y$	$+0.40\,z$ =	+0.008	+0.016
C.	.354	— .000	.327	1.0	1.75	0.41	— .040	— .032
C.	.373	— .000	.343	1.0	1.46	0.45	— .024	— .018
C.	2.445	+0.000	2.389	$+1.0\,x$	$+1.91\,y$	$+0.83\,z$ =	+0.022	+0.007
C.	.423	+ .000	.364	1.0	1.90	0.86	— .003	— .018
C.	.475	+ .000	.413	1.0	1.74	0.91	+ .046	+ .032
	Assumed Mean Difference:		2.367					

Normals:

			R
$+12.00\,x$	$+0.70\,y$	$-1.70\,z$ =	+0.015
+0.70	+39.49	+0.25 =	+0.235
−1.70	+0.25	+8.19 =	+0.025

Solution:

	R	R	
x =	+0.0013	± 0.0050	Wt. 11.64
y =	+0.0059	± 0.0026	39.43
z =	+0.0031	± 0.0059	7.95

$[nn] = 0.00697$ $[vv] = 0.00549$ Prob. Error 1 Eq. = ± 0″.210

$\pi = +0''.075 \pm 0''.034$

Lal. 38380	B. D. +29°, 3872	Mag. 6.0	R. A. 19h 57.7m	Decl. +29° 31′	Pos. Angle.
a	+29°, 3820	8.2	19 51.4	29 26	266°.6
b	+29°, 3919	8.0	20 3.8	29 18	98°.4

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	Oct. 19	23	37	2–3	50.5	389.824	384.728	+0.009	−0.013	774.548
	27	23	45	3	47	.889	.723	.008	.011	.609
	Nov. 1	23	39	3	45.5	.886	.763	.007	.011	.645
1895	Apr. 19	17	20	1–2	43.5	389.914	384.698	−0.014	+0.019	774.617
	21	16	17	2–3	38	.911	.706	.014	.019	.622
	May 13	16	6	2–3	35.5	.922	.691	.017	.023	.619
1897	Mar. 30	15	40	2	35	389.986	384.584	−0.105	+0.141	774.606
	31	15	46	3	31	.960	.577	.105	.141	.573
	Apr. 3	15	54	2–3	27	.992	.573	.106	.142	.601
1897	Sept. 24	23	21	3–4	53.5	390.021	384.562	−0.128	+0.172	774.627
	Oct. 10	23	37	2	40	.004	.559	.130	.174	.607
	18	0	19	3	43	.062	.541	.131	.176	.648
	Assumed Annual Proper Motion and Mean Sum:							+0.047	−0.063	774.610

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	5.096	+0.000	5.118	$+1.0\,x$	$-1.91\,y$	$-0.20\,z$	$= -0.046$	−0.039
C.	.166	+ .000	.185	1.0	1.90	0.18	+ .021	+ .027
C.	.123	− .000	.141	1.0	1.86	0.17	− .023	− .017
C.	5.216	−0.000	5.183	$+1.0\,x$	$+1.95\,y$	$+0.30\,z$	$= +0.019$	+0.016
C.	.205	− .000	.172	1.0	1.94	0.30	+ .008	+ .005
C.	.231	− .000	.191	1.0	1.73	0.36	+ .027	+ .024
C.	5.402	+0.000	5.156	$+1.0\,x$	$+1.86\,y$	$+2.24\,z$	$= -0.008$	−0.014
C.	.383	+ .000	.137	1.0	1.87	2.24	− .027	− .033
C.	.419	+ .000	.171	1.0	1.89	2.25	+ .007	− .000
C.	5.459	−0.000	5.159	$+1.0\,x$	$-1.79\,y$	$+2.73\,z$	$= -0.005$	−0.003
C.	.445	+ .000	.141	1.0	1.90	2.77	− .023	− .021
C.	.521	− .000	.214	1.0	1.91	2.79	+ .050	+ .052
	Assumed Mean Difference:		5.164					

Normals:

			R
$+12.00\,x$	$-0.03\,y$	$+15.43\,z$	$= +0.000$
-0.03	$+42.26$	-0.05	$= +0.097$
$+15.43$	-0.05	$+38.41$	$= +0.028$

Solution:

	R	R	
x	$= -0.0018$	± 0.0082	Wt. 5.80
y	$= +0.0023$	± 0.0030	42.26
z	$= +0.0014$	± 0.0046	18.58

$[nn] = 0.00814$ $[vv] = 0.00787$ Prob. Error 1 Eq. $= \pm 0''.252$

$\pi = +0''.029 \pm 0''.038$

15 Sagittae	B. D. +16°, 4121	Mag. 5.5	R. A. 19h 57.6m	Decl. +16° 41′	Pos. Angle.
a	+16°, 4119	7.0	19 57.4	16 44	316°.4

Date.		Sid. Time. h m.	Def.	Temp. °	Distance *a*. R	P. M. Correction. R	Corrected Sum from 31 b Aquilae. R
1892	Oct. 14	23 23	2	60.5	15.983	0.000	719.227*
	15	21 56	2	54.5	.988	.000	.218
	19	21 37	–	54.5	.980	.000	.227*
1893	Apr. 23	17 17	2	35.5	15.998	0.000	719.215
	25	17 46	–	35.5	16.000	.000	.196*
	May 6	17 32	3	42	.003	.000	.171
1897	Mar. 10	16 27	2	28	15.986	0 000	719.195
	30	16 49	2	35.5	.995	.000	.194
	31	16 50	3	30.5	16.006	.000	.206
1897	Sept. 30	22 0	2–3	58	15.986	0.000	719.212
	Oct. 2	22 7	3	43	.974	.000	.225
	4	22 16	2–3	47	.988	.000	.244
				Assumed Annual Proper Motion and Mean Sum :		0.000	719.211

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.				Residuals. R
C.	−0.000	15.983	+1.0 x	−0.59 y	−2.22 z	= −0.008	−0.002
C.	− .000	.988	1.0	0.59	2.21	− .003	+ .003
C.	− .000	.980	1.0	0.56	2.20	− .011	− .006
C.	−0.000	15.998	+1.0 x	+0.51 y	−1.70 z	= +0.007	−0.001
C.	+ .000	16.000	1.0	0.50	1.68	+ .009	+ .001
C.	+ .001	.004	1.0	0.39	1.66	+ .013	+ .007
C.	+0.000	15.986	+1.0 x	+0.70 y	+2.19 z	= −0.005	−0.012
C.	+ .000	.995	1.0	0.66	2.24	+ .004	− .003
C.	+ .000	16.006	1.0	0.65	2.24	+ .015	+ .008
C.	−0.000	15.986	+1.0 x	−0.67 y	+2.74 z	= −0.005	+0.005
C.	− .000	.974	1.0	0.66	2.75	− .017	− .007
C.	− .001	.987	1.0	0.65	2.76	− .004	+ .006
Assumed Mean Distance :		15.991					

Normals :

			R	
+ 12.00 x	− 0.31 y	+ 3.25 z	= − 0.005	
− 0.31	+ 4.33	+ 0.51	= + 0.054	
+ 3.25	+ 0.51	+ 60.65	= − 0.040	

Solution :

	R	R	
x =	+ 0.0001	± 0.0014	Wt. 11.80
y =	+ 0.0125	± 0.0023	4.32
z =	− 0.0008	± 0.0006	59.69

$[nn] = 0.00109$ $[vv] = 0.00043$ Prob. Error 1 Eq. = $\pm$ 0.″059

$\pi = + 0.''159 \pm 0.''028$

* These are the mean values for the epoch.

Lal. 38383	B. D. +22°, 3908	Mag. 7.0	R. A. 19h 57.8m	Decl. +22° 58′	Pos. Angle.
a	+22°, 3872	5.9	19 52.9	22 42	257°.0
b	+22°, 3941	8.1	20 2.7	23 0	88°.2

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	Nov. 11	0	25	3	38	322.848	323.146	—0.110	+0.092	645.976
	18	0	20	3	35	.854	.162	.108	.091	.999
	20	0	22	2–3	27.5	.867	.141	.108	.091	.991
1894	Apr. 9	16	41	2–3	32.5	322.815	323.159	—0.070	+0.059	645.963
	14	17	2	2–3	38.5	.801	.160	.069	.058	.950
	17	17	0	2	37	.818	.151	.069	.058	.958
1895	May 28	17	31	3–4	54.5	322.685	323.250	+0.038	—0.032	645.941
	June 1	17	25	3	74.5	.731	.252	.039	.033	.989
	16	17	7	3	54.5	.723	.254	.043	.036	.984
1895	Nov. 1	23	48	1	35.5	322.653	323.313	+0.080	—0.067	645.979
	11	0	32	3	28.5	.655	.297	.083	.070	.965
	30	23	39	2–3	32	.652	.315	.088	.074	.981
	Assumed Annual Proper Motion and Mean Sum:							—0.096	+0.081	645.973

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	0.298	—0.000	0.500	+1.0 x	+1.86 y	—1.14 z =	+0.017	+0.003
C.	.308	— .000	.507	1.0	1.79	1.12	+ .024	+ .011
C.	.274	— .000	.473	1.0	1.76	1.12	— .010	— .023
C.	0.344	+0.000	0.473	+1.0 x	—1.92 y	—0.73 z =	—0.010	+0.005
C.	.359	+ .000	.486	1.0	1.96	0.72	+ .003	+ .018
C.	.333	+ .000	.460	1.0	1.98	0.71	— .023	— .008
C.	0.565	+0.000	0.495	+1.0 x	—1.66 y	+0.40 z =	+0.012	+0.024
C.	.521	— .000	.449	1.0	1.58	0.41	— .034	— .022
C.	.531	— .000	.452	1.0	1.22	0.45	— .031	— .022
C.	0.660	—0.000	0.513	+1.0 x	+1.94 y	+0.83 z =	+0.030	+0.015
C.	.642	+ .000	.489	1.0	1.86	0.86	+ .006	— .008
C.	.663	— .000	.501	1.0	1.58	0.91	+ .018	+ .006
	Assumed Mean Difference: 0.483							

Normals:

			R
+ 12.00 x	+ 0.47 y	— 1.68 z =	+ 0.002
+ 0.47	+ 37.68	+ 0.92 =	+ 0.285
— 1.68	+ 0.92	+ 8.14 =	+ 0.009

Solution:

	R	R	
x =	— 0.0001	± 0.0036	Wt. 11.64
y =	+ 0.0075	± 0.0020	37.54
z =	+ 0.0003	± 0.0043	7.87

$[nn] = 0.00512$ $[vv] = 0.00296$ Prob. Error 1 Eq. = ± 0″.155

$\pi = + 0''.095 \pm 0''.025$

Groom. 3042	B. D. +52°, 2623	Mag. 5.9	R. A. $20^h\ 2.4^m$	Decl. +52° 44′	Pos. Angle.
a	+51°, 2733	8.4	19 56.0	51 53	228°.5
b	+53°, 2363	8.0	20 8.7	53 28	52°.1

Date.		Sid. Time. h m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	June 6	16 15	2	63.5	371.071	338.118	0.000	0.000	709.189
	10	16 6	2	58	.080	.127	.000	.000	.207
	17	16 25	3	58	.077	.088	.000	.000	.165
	25	16 29	2–3	68.5	.102	.117	.000	.000	.219
1901	Nov. 22	0 21	2	33.5	371.055	338.091	0.000	0.000	709.146
	27	0 50	3–4	17.5	.076	.083	.000	.000	.159
	28	0 45	4	15.5	.053	.096	.000	.000	.149
	30	1 7	2	22	.075	.120	.000	.000	.195
	Dec. 6	1 33	3	12.5	.065	.092	.000	.000	.157
	12	1 25	3–4	34.5	.094	.099	.000	.000	.193
1902	May 5	15 19	2	55.5	371.096	338.080	0.000	0.000	709.176
	8	14 31	3–4	51	.094	.103	.000	.000	.197
	11	14 55	2–3	42.5	.096	.080	.000	.000	.176
	15	14 32	3	44	.090	.090	.000	.000	.180
						Assumed Annual Proper Motion and Mean Sum :	0.000	0.000	709.179

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	32.953	−0.000	32.953	$+1.0\,x$	$+2.00\,y$	$-0.57\,z$	$=-0.028$	−0.015
C.	.953	− .001	.952	1.0	1.97	0.56	− .029	− .017
C.	.989	+ .001	.990	1.0	1.90	0.54	+ .009	+ .021
C.	.985	− .002	.983	1.0	1.78	0.52	+ .002	+ .013
C.	32.964	+0.002	32.966	$+1.0\,x$	$-1.97\,y$	$-0.11\,z$	$=-0.015$	−0.006
C.	.993	+ .001	.994	1.0	1.98	0.09	+ .013	+ .021
C.	.957	+ .001	.958	1.0	1.98	0.09	− .023	− .015
C.	.955	− .001	.954	1.0	1.97	0.09	− .027	− .019
C.	.973	+ .001	.974	1.0	1.95	0.07	− .007	− .000
C.	.995	− .001	.994	1.0	1.90	0.06	+ .013	+ .019
C.	33.016	+0.000	33.016	$+1.0\,x$	$+1.90\,y$	$+0.34\,z$	$=+0.035$	+0.011
C.	32.991	− .001	32.990	1.0	1.93	0.35	+ .009	− .016
C.	33.016	+ .000	33.016	1.0	1.96	0.36	+ .035	+ .010
C.	.000	− .000	.000	1.0	2.01	0.37	+ .019	− .007
			Assumed Mean Difference :	32.981				

Normals :

			R	
$+14.00\,x$	$+3.70\,y$	$-1.28\,z$	$=+0.006$	
$+3.70$	$+52.88$	-0.42	$=+0.191$	
-1.28	-0.42	$+1.75$	$=+0.065$	

Solution :

	R	R	
x	$=+0.0032$	± 0.0031	Wt. 12.84
y	$=+0.0037$	± 0.0016	51.90
z	$=+0.0407$	± 0.0088	1.63

$[nn] = 0.00647$ $\quad [vv] = 0.00307$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.142$

$$\pi = +0''.047 \pm 0''.020$$

Piazzi 20^h, 23	B. D. $+15°$, 4074	Mag. 7.0	R. A. 20^h 4.5^m	Decl. $+15°$ 46′	Pos. Angle.
a	$+15°$, 4063	8.2	20 2.5	15 40	258°.6
b	$+15°$, 4096	6.8	20 6.9	15 50	81°.8

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct.	14	23	56	2	60	141.070	167.277	−0.060	+0.056	308.343
		15	22	23	2	54	.070	.285	.060	.055	.350
		19	22	2	–	53.5	.064	.289	.059	.055	.349
1893	Apr.	25	17	20	–	36	141.070	167.267	−0.046	+0.042	308.333
	May	6	18	7	3	42	.045	.262	.045	.041	.303
		8	17	35	2	45	.061	.293	.045	.041	.350
1897	Mar.	30	17	19	2	35.5	140.952	167.374	+0.060	−0.056	308.330
	Apr.	3	16	33	2–3	27	.955	.384	.061	.056	.344
		18	17	4	2–3	40.5	.955	.392	.062	.057	.352
1897	Sept.	30	23	14	2–3	57.5	140.924	167.400	+0.074	−0.068	308.330
	Oct.	2	22	32	3	41	.930	.403	.074	.069	.338
		4	23	13	2–3	47	.941	.391	.074	.069	.337
								Assumed Annual Proper Motion and Mean Sum:	−0.027	+0.025	308.338

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	26.207	−0.000	26.323	$+1.0\,x$	$+1.91\,y$	$-2.22\,z$ =	+0.006	−0.004
C.	.215	− .001	.329	1.0	1.92	2.21	+ .012	+ .002
C.	.225	− .001	.338	1.0	1.95	2.20	+ .021	+ .011
C.	26.197	+0.000	26.285	$+1.0\,x$	$-2.00\,y$	$-1.69\,z$ =	−0.032	−0.021
C.	.217	+ .003	.306	1.0	1.96	1.66	− .011	− .000
C.	.232	− .001	.317	1.0	1.95	1.65	+ .000	+ .010
C.	26.422	+0.001	26.307	$+1.0\,x$	$-1.81\,y$	$+2.24\,z$ =	−0.010	−0.001
C.	.429	− .001	.311	1.0	1.86	2.25	− .006	+ .003
C.	.437	− .001	.317	1.0	1.98	2.29	+ .000	+ .010
C.	26.476	+0.001	26.335	$+1.0\,x$	$+1.77\,y$	$+2.74\,z$ =	+0.018	+0.008
C.	.473	+ .000	.330	1.0	1.80	2.75	+ .013	+ .003
C.	.450	+ .000	.307	1.0	1.83	2.76	− .010	− .020
			Assumed Mean Difference: 26.317					

Normals:

			R″	
$+12.00\,x$	$-0.38\,y$	$+3.40\,z$	=	+0.001
−0.38	+43.16	−0.83	=	+0.228
+3.40	−0.83	+61.00	=	+0.008

Solution:

	R	R	
x =	+0.0002	± 0.0023	Wt. 11.81
y =	+0.0053	± 0.0012	43.14
z =	+0.0002	± 0.0010	60.03

$[nn] = 0.00250$ $[vv] = 0.00129$ Prob. Error 1 Eq. = ± 0″.102

$\pi = +0''.067 \pm 0''.016$

Groom. 3150	B. D. +66°, 1281	Mag. 6.2	R. A. $20^h\ 16.1^m$	Decl. +66° 23′	Pos. Angle.
a	+65°, 1433	7.0	20 5.8	65 53	243°.7
b	+66°, 1292	7.3	20 24.4	66 40	71°.3

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr.	22	14 25	3–4	41.5	330.509	246.744	+0.025	−0.027	577.251
		29	14 47	1–2	66	.504	.764	.024	.027	.265
	May	1	14 8	3	36	.501	.747	.024	.026	.246
1903	Nov.	6	0 47	3	29.5	330.508	246.745	+0.005	−0.006	577.252
		8	1 41	3–4	38.5	.496	.747	.005	.006	.242
		9	2 0	3	41.5	.528	.756	.005	.006	.283
	Dec.	6	1 51	3	25	.509	.748	.003	.003	.257
		10	1 47	3	27.5	.506	.732	.002	.002	.238
		11	2 7	2–3	25.5	.532	.746	.002	.002	.278
1904	Apr.	13	14 23	2–3	27	330.535	246.705	−0.010	+0.011	577.241
		16	14 17	2	25.5	.527	.711	.010	.011	.239
		18	14 54	3–4	36	.558	.723	.010	.011	.282
						Assumed Annual Proper Motion and Mean Sum:		+0.036	−0.039	577.256

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	83.765	+0.001	83.818	$+1.0\,x$	$+1.83\,y$	$-0.70\,z$ =	+0.028	+0.014
C.	.740	− .001	.790	1.0	1.91	0.68	+ .000	− .015
C.	.754	+ .001	.805	1.0	1.92	0.67	+ .015	+ .000
C.	83.763	+0.001	83.775	$+1.0\,x$	$-1.91\,y$	$-0.15\,z$ =	−0.015	+0.001
C.	.749	+ .002	.762	1.0	1.92	0.15	− .028	− .012
C.	.772	− .004	.779	1.0	1.92	0.15	− .011	+ .005
C.	.761	− .000	.767	1.0	1.80	0.07	− .023	− .008
C.	.774	+ .003	.781	1.0	1.75	0.06	− .009	+ .005
C.	.786	− .003	.787	1.0	1.73	0.06	− .003	+ .010
C.	83.830	+0.002	83.811	$+1.0\,x$	$+1.68\,y$	$+0.28\,z$ =	+0.021	+0.006
C.	.816	+ .002	.797	1.0	1.74	0.29	+ .007	− .009
C.	.835	− .004	.810	1.0	1.78	0.29	+ .020	+ .004
	Assumed Mean Difference:		83.790					

Normals:

			R
$+12.00\,x$	$-0.17\,y$	$-1.83\,z$ =	+0.002
−0.17	+40.03	−1.18 =	+0.329
−1.83	−1.18	+1.70 =	−0.007

Solution:

	R	R	
x =	+0.0006	± 0.0022	Wt. 9.98
y =	+0.0083	± 0.0011	39.00
z =	+0.0022	± 0.0058	1.38

$[nn] = 0.00365$ $[vv] = 0.00091$ Prob. Error 1 Eq. = ± 0″.086

$\pi = +0''.105 \pm 0''.014$

γ Cygni	B. D. +39°, 4159	Mag. 2.8	R. A. $20^h\ 17.0^m$	Decl. +39° 47′	Pos. Angle.
a	+39°, 4103	8.5	20 10.1	39 15	248°.7
b	+40°, 4194	8.4	20 24.0	40 19	68°.6

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1902	Apr.	27	16 58	3	48	409.711	408.384	0.000	0.000	818.095
	May	1	16 44	3	48	.692	.361	.000	.000	.053
		3	17 1	2–3	43.5	.676	.359	.000	.000	.035
		5	16 8	2	56	.679	.372	.000	.000	.051
1902	Nov.	20	0 56	3	44	409.700	408.411	0.000	0.000	818.111
		28	0 48	3	32	.692	.388	.000	.000	.080
	Dec.	1	0 52	3	32	.702	.418	.000	.000	.120
		5	0 59	2–3	19	.708	.419	.000	.000	.127
		6	1 20	2–3	15	.728	.406	.000	.000	.134
		7	1 0	3	29	.698	.432	.000	.000	.130
		8	0 55	2–3	13	.663	.385	.000	.000	.048
1903	Apr.	18	16 44	2	34	409.682	408.365	0.000	0.000	818.047
		19	15 57	3	42	.678	.371	.000	.000	.049
		22	16 47	2	40	.695	.362	.000	.000	.057
						Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	818.081

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	1.327	−0.000	1.327	$+1.0\,x$	$+1.94\,y$	$-0.68\,z$	$= +0.017$	+0.009
S.	.331	+ .000	.331	1.0	1.96	0.67	+ .021	+ .013
S.	.317	+ .000	.317	1.0	1.98	0.66	+ .007	− .001
S.	.307	+ .000	.307	1.0	1.98	0.66	− .003	− .011
S.	1.289	−0.000	1.289	$+1.0x$	$-1.92\,y$	$-0.11\,z$	$= -0.021$	−0.002
S.	.304	+ .000	.304	1.0	1.86	0.09	− .006	+ .013
S.	.284	− .000	.284	1.0	1.83	0.08	− .026	− .008
S.	.289	− .000	.289	1.0	1.78	0.07	− .021	− .003
S.	.322	− .000	.322	1.0	1.76	0.07	+ .012	+ .030
S.	.266	− .000	.266	1.0	1.75	0.07	− .044	− .026
S.	.278	+ .000	.278	1.0	1.73	0.07	− .032	− .014
S.	1.317	+0.000	1.317	$+1.0\,x$	$+1.87\,y$	$+0.30\,z$	$= +0.007$	+0.001
S.	.307	+ .000	.307	1.0	1.88	0.30	− .003	− .009
S.	.333	+ .000	.333	1.0	1.90	0.31	+ .023	+ .017
	Assumed Mean Difference:		1.310					

Normals:

$$\begin{aligned} +14.00\,x + 0.88\,y - 2.32\,z &= -0.069 \\ +0.88\,x + 48.90\,y - 2.51\,z &= +0.380 \\ -2.32\,x - 2.51\,y + 2.10\,z &= -0.011 \end{aligned}$$

Solution:

	R	R	
$x =$	−0.0057	± 0.0032	Wt. 11.3
$y =$	+0.0078	± 0.0016	45.6
$z =$	−0.0019	± 0.0085	1.6

$[nn] = 0.00608$ $[vv] = 0.00286$ Prob. Error 1 Eq. $= \pm 0''.137$

$\pi = +0''.099 \pm 0''.020$

Groom. 3215	B. D. +41°, 3799	Mag. 6.7	R. A. $20^h\ 27.8^m$	Decl. +41° 23′	Pos. Angle.
a	+40°, 4164	7.5	20 20.8	40 51	247°.7
b	+41°, 3845	6.5	20 34.4	41 45	74°.0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Oct. 14	1 24	3	42	401.190	366.886	+0.001	−0.004	768.073
	20	1 20	3–4	46	.200	.875	.001	.003	.073
	31	1 40	3–4	41.5	.186	.892	.001	.003	.076
	Nov. 4	1 48	3	42	.201	.901	.001	.003	.100
	19	1 44	3	45.5	.210	.899	.001	.002	.108
	20	1 46	3–4	42.5	.196	.886	.001	.002	.081
1903	Apr. 22	15 16	3–4	41	401.185	366.892	−0.002	+0.005	768.080
	28	15 58	3	54	.204	.899	.002	.005	.106
	29	16 10	1–2	66	.198	.884	.002	.005	.085
	May 1	15 40	3	34.5	.225	.892	.002	.006	.121
	6	15 40	–	48	.229	.896	.002	.006	.129
	6	16 14	–	47	.215	.915	.002	.006	.134
1903	Oct. 28	0 43	2–3	33	401.191	366.883	−0.005	+0.014	768.083
	29	0 49	2–3	46.5	.205	.853	.005	.014	.067
	Nov. 4	0 38	2	54.5	.214	.882	.005	.014	.105
							Assumed Annual Proper Motion and Mean Sum:	+0.006	−0.017	768.095

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	34.304	+0.001	34.310	$+1.0\,x$	$-1.69\,y$	$-0.22\,z$ =	+0.001	−0.001
C.	.325	+ .001	.330	1.0	1.78	0.20	+ .021	+ .018
C.	.294	+ .001	.299	1.0	1.90	0.17	− .010	− .013
C.	.300	− .000	.304	1.0	1.92	0.16	− .005	− .008
C.	.311	− .001	.313	1.0	1.93	0.12	+ .004	+ .001
C.	.310	+ .001	.314	1.0	1.93	0.12	+ .005	+ .002
C.	34.293	+0.001	34.287	$+1.0\,x$	$+1.88\,y$	$+0.30\,z$ =	−0.022	−0.018
C.	.305	− .000	.298	1.0	1.93	0.32	− .011	− .007
C.	.314	+ .000	.307	1.0	1.94	0.32	− .002	+ .002
C.	.333	− .001	.324	1.0	1.95	0.33	+ .015	+ .019
C.	.333	− .002	.323	1.0	1.98	0.34	+ .014	+ .018
C.	.300	− .002	.290	1.0	1.98	0.34	− .019	− .015
C.	34.308	+0.001	34.290	$+1.0\,x$	$-1.87\,y$	$+0.82\,z$ =	−0.019	−0.022
C.	.352	+ .001	.334	1.0	1.88	0.82	+ .025	+ .022
C.	.332	− .000	.313	1.0	1.92	0.84	+ .004	+ .001
	Assumed Mean Difference:		34.309					

Normals:

			R
$+15.00\,x$	$-5.16\,y$	$+3.44\,z$	$= +0.001$
-5.16	$+54.14$	$+0.92$	$= -0.093$
$+3.44$	$+0.92$	$+2.86$	$= -0.002$

Solution:

	R	R	
x =	−0.0007	± 0.0033	Wt. 10.16
y =	−0.0018	± 0.0015	50.24
z =	+0.0006	± 0.0074	1.99

$[nn] = 0.00300$ $[vv] = 0.00283$ Prob. Error 1 Eq. = ± 0″.132

$\pi = -0''.023 \pm 0''.019$

Lal. 39866	B. D. +4°, 4510	Mag. 8.4	R. A. 20h 32.3m	Decl. +4° 28′	Pos. Angle.
a	+4°, 4486	6.8	20 26.8	4 25	267°.5
b	+4°, 4529	6.8	20 36.5	4 53	68°.2

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	Oct. 16	22	16	−	57.5	391.233	316.151	+0.137	−0.164	707.357
	19	22	37	−	51.5	.226	.142	.136	.163	.341
	21	22	36	3	50	.270	.165	.136	.163	.408
1893	Apr. 25	18	25	−	35.5	391.345	316.133	+0.105	−0.125	707.458
	May 6	18	47	2	41.5	.291	.106	.103	.123	.377
	8	18	12	2	45.5	.322	.170	.102	.122	.472
1897	Mar. 31	17	22	3	30	391.535	315.835	−0.139	+0.166	707.397
	Apr. 3	17	13	2−3	27	.537	.831	.140	.167	.395
	15	17	50	2	36	.558	.818	.142	.169	.403
1897	Sept. 30	22	29	2−3	58	391.586	315.785	−0.170	+0.203	707.404
	Oct. 2	23	6	3	40	.565	.822	.171	.204	.420
	4	22	39	2−3	47	.555	.796	.172	.205	.384
	Assumed Annual Proper Motion and Mean Sum:							+0.062	−0.074	707.402

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	75.082	+0.005	75.388	$+1.0\,x$	$-1.85\,y$	$-2.21\,z$ =	−0.013	−0.004
C.	.084	+ .006	.389	1.0	1.88	2.20	− .011	− .003
C.	.105	− .001	.403	1.0	1.90	2.20	+ .003	+ .011
C.	75.212	−0.006	75.436	$+1.0\,x$	$+1.96\,y$	$-1.69\,z$ =	+0.036	+0.028
C.	.185	+ .003	.414	1.0	1.94	1.66	+ .014	+ .006
C.	.152	− .007	.369	1.0	1.93	1.65	− .031	− .039
C.	75.700	+0.001	75.396	$+1.0\,x$	$+1.69\,y$	$+2.24\,z$ =	−0.004	−0.011
C.	.706	+ .001	.400	1.0	1.73	2.25	+ .000	− .007
C.	.740	− .000	.429	1.0	1.89	2.28	+ .029	+ .021
C.	75.801	−0.000	75.428	$+1.0\,x$	$-1.65\,y$	$+2.74\,z$ =	+0.028	+0.035
C.	.743	− .002	.366	1.0	1.68	2.75	− .034	− .027
C.	.759	+ .002	.384	1.0	1.71	2.76	− .016	− .009
	Assumed Mean Difference:		75.400					

Normals:

			R
$+12.00\,x$	$+0.47\,y$	$+3.41\,z$	$= +0.002$
$+0.47$	$+39.76$	$+0.83$	$= +0.162$
$+3.41$	$+0.83$	$+60.87$	$= +0.008$

Solution:

	R	R	
x =	−0.0000	± 0.0047	Wt. 11.81
y =	+0.0041	± 0.0026	39.73
z =	+0.0001	± 0.0021	59.89

$[nn] = 0.00578$ $[vv] = 0.00512$ Prob. Error 1 Eq. = ± 0″.204

$\pi = +0''.052 \pm 0''.032$

Groom. 3263	B. D. +59°, 2272	Mag. 6.2	R. A. $20^h\ 37.2^m$	Decl. +59° 59′	Pos. Angle.
a	+59°, 2254	7.5	20 28.9	59 35	248°.1
b	+60°, 2169	8.0	20 45.8	60 35	60°.5

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	May	7	16	6	2	53	321.216	347.445	0.000	0.000	668.661
		15	16	37	2	52.5	.227	.464	.000	.000	.691
	June	3	16	32	2–3	56.5	.213	.446	.000	.000	.659
		5	16	40	2	63	.233	.448	.000	.000	.681
1901	Oct.	8	1	4	2–3	50.5	321.225	347.465	0.000	0.000	668.690
		10	0	36	3	57.5	.223	.468	.000	.000	.691
		28	0	24	2	42.5	.216	.439	.000	.000	.655
	Nov.	2	1	15	2–3	41.5	.208	.426	.000	.000	.634
		4	0	35	3–4	39.5	.243	.437	.000	.000	.680
		6	1	33	3	34.5	.203	.428	.000	.000	.631
1902	Apr.	30	15	42	3–4	52.5	321.179	347.392	0.000	0.000	668.571
	May	1	15	23	3	48	.194	.418	.000	.000	.612
		3	16	4	2	44.5	.185	.391	.000	.000	.576
		5	14	33	2	57	.222	.423	.000	.000	.645
								Assumed Annual Proper Motion and Mean Sum:	0.000	0.000	668.648

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	26.229	—0 001	26.228	$+1.0\,x$	$-1.93\,y$	$-0.65\,z$	$= +0.006$	—0.002
C.	.237	— .002	.235	1.0	1.97	0.63	+ .013	+ .006
C.	.233	— .000	.233	1.0	1.95	0.58	+ .011	+ .005
C.	.215	— .001	.214	1.0	1.93	0.58	— .008	— .014
C.	26.240	—0.002	26.238	$+1.0\,x$	$+1.35\,y$	$-0.23\,z$	$= +0.016$	+0.014
C.	.245	— .002	.243	1.0	1.40	0.23	+ .021	+ .019
C.	.223	— .000	.223	1.0	1.75	0.18	+ .001	+ .000
C.	.218	+ .001	.219	1.0	1.80	0.16	— .003	— .004
C.	.194	— .001	.193	1.0	1.82	0.16	— .029	— .030
C.	.225	+ .001	.226	1.0	1.85	0.15	+ .004	+ .003
C.	26.213	+0.003	26.216	$+1.0\,x$	$-1.86\,y$	$+0.33\,z$	$= -0.006$	+0.003
C.	.224	+ .001	.225	1.0	1.87	0.33	+ .003	+ .012
C.	.206	+ .003	.209	1.0	1.90	0.33	— .013	— .004
C.	.201	+ .000	.201	1.0	1.91	0.34	— .021	— .011

Assumed Mean Difference: 26.222

Normals:

			R
$+14.00\,x$	$-5.35\,y$	$-2.22\,z$	$= -0.005$
-5.35	$+46.13$	$+0.44$	$= +0.028$
-2.22	$+0.44$	$+2.15$	$= -0.031$

Solution:

	R	R	
$x =$	-0.0029	± 0.0028	Wt. 11.18
$y =$	$+0.0004$	± 0.0014	43.99
$z =$	-0.0174	± 0.0069	1.80

$[nn] = 0.00261$ $[vv] = 0.00205$ Prob. Error 1 Eq. $= \pm 0''.116$

$\pi = +0''.005 \pm 0''.018$

Fed. 3562–3	B. D. +75°, 752	Mag. 7.2	R. A. $20^h\ 39.2^m$	Decl. +75° 4′	Pos. Angle.
a	+74°, 854	7.8	20 16.7	74 58	264°.7
b	+75°, 770	8.0	21 4.4	75 2	90°.4

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr. 27	14	34	2–3	42.5	416.263	458.928	—0.007	—0.048	875.136
	28	15	18	3	54.5	.266	.916	.007	.048	.127
	May 6	14	53	–	48	.263	.940	.006	.045	.152
1903	Nov. 6	1	30	3	29.5	416.255	458.916	—0.001	—0.010	875.160
	8	2	30	3–4	38.5	.267	.912	.001	.010	.168
	11	1	17	3–4	42.5	.270	.937	.001	.010	.196
	Dec. 7	1	45	3–4	28.5	.264	.894	.001	.005	.152
	10	2	40	3	26.5	.251	.881	.001	.004	.127
	15	2	20	3	15.5	.254	.889	.001	.004	.138
1904	Apr. 13	15	50	2–3	26	416.246	458.855	+0.003	+0.020	875.124
	16	15	0	2	25	.269	.862	.003	.020	.154
	18	15	50	3–4	36	.247	.864	.003	.020	.134
							Assumed Annual Proper Motion and Mean Sum:	—0.010	—0.070	875.147

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	42.665	+0.001	42.625	$+1.0\,x$	$-1.93\,y$	$-0.68\,z$	$= -0.006$	+0.000
C.	.650	+ .001	.610	1.0	1.94	0.68	— .021	— .014
C.	.677	— .000	.638	1.0	1.93	0.65	+ .007	+ .013
C.	42.661	—0.001	42.651	$+1.0\,x$	$+1.88\,y$	$-0.15\,z$	$= +0.020$	+0.012
C.	.645	— .001	.635	1.0	1.87	0.15	+ .004	— .004
C.	.667	— .002	.656	1.0	1.85	0.14	+ .025	+ .017
C.	.630	— .000	.626	1.0	1.54	0.07	— .005	— .012
C.	.630	+ .000	.627	1.0	1.47	0.06	— .004	— .010
C.	.635	+ .000	.632	1.0	1.33	0.05	+ .001	— .005
C.	42.609	+0.001	42.627	$+1.0\,x$	$-1.86\,y$	$+0.28\,z$	$= -0.004$	+0.004
C.	.593	— .000	.610	1.0	1.88	0.29	— .021	— .013
C.	.617	+ .001	.635	1.0	1.90	0.29	+ .004	+ .012
			Assumed Mean Difference: 42.631					

Normals:

$$\begin{aligned} +12.00\,x - 1.50\,y - 1.77\,z &= +0.000 \\ -1.50\,x + 38.57\,y + 1.17\,z &= +0.157 \\ -1.77\,x + 1.17\,y + 1.67\,z &= +0.001 \end{aligned}$$

Solution:

	R	R	Wt.
$x =$	+0.0002	± 0.0027	10.13
$y =$	+0.0041	± 0.0014	37.74
$z =$	—0.0019	± 0.0072	1.39

$[nn] = 0.00208$ $[vv] = 0.00142$ Prob. Error 1 Eq. = ± 0″.108

$\pi = +\,0''.052 \pm 0''.018$

6 H. Cephei	B. D. +57°, 2240	Mag. 4.5	R. A. $20^h\ 41.8^m$	Decl. +57° 4′	Pos. Angle.
a	+56°, 2462	8.0	20 35.1	56 5	222°.6
b	+58°, 2183	7.0	20 48.9	58 6	42°.7

	Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	June 27	17	23	2	73	381.358	404.302	0.000	0.000	785.660
	29	16	28	–	—	.378	.318	.000	.000	.696
	30	16	47	3	79	.323	.314	.000	.000	.637
	July 4	15	53	3	69.5	.349	.327	.000	.000	.676
1901	Dec. 18	2	10	2	14	381.300	404.269	0.000	0.000	785.569
	21	1	59	2	13.5	.300	.290	.000	.000	.590
	27	2	27	4	36	.332	.287	.000	.000	.619
	Jan. 13	1	30	3–4	18	.297	.303	.000	.000	.600
	15	1	40	2	28	.319	.282	.000	.000	.601
	16	1	40	2–3	31.5	.326	.288	.000	.000	.614
1902	May 8	15	19	3–4	50.5	381.302	404.291	0.000	0.000	785.593
	11	15	40	2–3	42	.301	.278	.000	.000	.579
	15	15	17	3	43.5	.315	.301	.000	.000	.616
	16	15	41	3	53	.327	.302	.000	.000	.629
	Assumed Annual Proper Motion and Mean Sum:							0.000	0.000	785.620

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	22.944	−0.001	22.943	$+1.0\,x$	$-2.00\,y$	$-0.51\,z$	$= -0.030$	−0.019
C.	.940	− .002	.938	1.0	1.98	0.51	− .035	− .024
C.	.991	− .000	.991	1.0	1.97	0.51	+ .018	+ .029
C.	.978	− .002	.976	1.0	1.92	0.50	+ .003	+ .014
C.	22.969	+0.001	22.970	$+1.0\,x$	$+1.97\,y$	$-0.04\,z$	$= -0.003$	−0.004
C.	.990	+ .001	.991	1.0	1.96	−0.03	+ .018	+ .017
C.	.955	+ .000	.955	1.0	1.95	−0.01	− .018	− .020
C.	23.006	+ .001	23.007	1.0	1.73	+0.03	+ .034	+ .031
C.	22.963	+ .001	22.964	1.0	1.71	+0.04	− .009	− .012
C.	.962	+ .000	.962	1.0	1.70	+0.04	− .011	− .014
C.	22.989	+0.001	22.990	$+1.0\,x$	$-1.65\,y$	$+0.35\,z$	$= +0.017$	+0.008
C.	.977	+ .001	.978	1.0	1.70	0.36	+ .005	− .004
C.	.986	+ .000	.986	1.0	1.76	0.37	+ .013	+ .004
C.	.975	− .000	.975	1.0	1.78	0.37	+ .002	− .007
	Assumed Mean Difference:		22.973					

Normals:

$$+14.00\,x - 3.74\,y - 0.55\,z = +0.004$$
$$-3.74 + 47.69 + 1.52 = +0.043$$
$$-0.55 + 1.52 + 1.56 = +0.035$$

Solution:

	R	R	
$x =$	$+0.0013$	± 0.0035	Wt. 13.59
$y =$	$+0.0003$	± 0.0019	45.47
$z =$	$+0.0229$	± 0.0107	1.50

$[nn] = 0.00494$ $\quad [vv] = 0.00411$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.165$

$$\pi = +0''.003 \pm 0''.024$$

η Cephei	B. D. +61°, 2050	Mag. 3.7	R. A. $20^h\ 42.3^m$	Decl. +61° 17′	Pos. Angle.
a	+61°, 2028	7.3	20 31.2	61 16	267°.8
b	+60°, 2179	7.9	20 52.7	61 0	101°.5

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Apr.	28	17	37	3	51	381.010	396.165	+0.007	−0.001	777.181
	May	1	17	18	2	48	380.975	.129	.007	.001	.110
		3	17	29	2–3	43	.998	.148	.007	.001	.152
		5	16	38	2	56	381.001	.148	.007	.001	.155
1902	Nov.	4	23	33	3	48	380.982	396.173	+0.002	−0.000	777.157
		5	0	58	2	50	381.002	.148	.002	.000	.152
		20	0	25	3	44	.010	.172	.001	.000	.183
		21	0	47	4	53	380.998	.158	.001	.000	.157
	Dec.	1	2	12	3	32	.985	.163	.001	.000	.149
		5	1	52	2–3	17	.994	.177	.001	.000	.172
1903	Apr.	18	16	16	2	35	381.018	396.139	−0.003	+0.001	777.155
		19	15	21	3	41	.000	.147	.003	.001	.145
		22	16	21	2	40	.001	.149	.003	.001	.148
									+0.010	−0.002	777.156

Assumed Annual Proper Motion and Mean Sum : +0.010 −0.002 777.156

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	15.155	−0.000	15.147	$+1.0\,x$	$-1.90\,y$	$-0.68\,z$	$= -0.003$	+0.004
S.	.154	+ .001	.147	1.0	1.89	0.67	− .003	+ .004
S.	.150	+ .000	.142	1.0	1.88	0.66	− .008	− .001
S.	.147	+ .000	.139	1.0	1.86	0.66	− .011	− .004
S.	15.191	−0.000	15.189	$+1.0\,x$	$+1.84\,y$	$-0.16\,z$	$= +0.039$	+0.020
S.	.146	+ .000	.144	1.0	1.84	0.15	− .006	− .025
S.	.162	− .001	.160	1.0	1.68	0.11	+ .010	− .008
S.	.160	− .000	.159	1.0	1.66	0.11	+ .009	− .008
S.	.178	+ .000	.177	1.0	1.51	0.08	+ .027	+ .010
S.	.183	− .000	.182	1.0	1.44	0.07	+ .032	+ .016
S.	15.121	+0.000	15.125	$+1.0\,x$	$-1.92\,y$	$+0.30\,z$	$= -0.025$	−0.018
S.	.147	+ .000	.151	1.0	1.92	0.30	+ .001	+ .008
S.	.148	+ .000	.152	1.0	1.91	0.31	+ .002	+ .009

Assumed Mean Difference : 15.150

Normals : $+13.00\,x - 3.31\,y - 2.44\,z = +0.062$ (R)
$-3.31 + 41.91 + 2.13 = +0.266$
$-2.44 + 2.13 + 2.13 = -0.002$

Solution : $x = +0.0065 \pm 0.0030$ (R) Wt. 10.2
$y = +0.0069 \pm 0.0015$ (R) 39.7
$z = +0.0000 \pm 0.0077$ (R) 1.6

$[nn] = 0.00420$ $[vv] = 0.00198$ Prob. Error 1 Eq. = $\pm$ 0.″121

$\pi = +0.''088 \pm 0.''019$

Fed. 3638	B. D. +74°, 889	Mag. 7.8	R. A. 20h 52.6	Decl. +74° 12′	Pos. Angle.
a	+74°, 870	8.6	20 31.9	74 31	281°.6
b	+74°, 911	8.5	21 14.4	74 13	90°.1

Date.		Sid Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1903	Apr. 28	14 34	3	54.5	405.837	419.644	—0.021	—0.041	825.419
	29	15 29	1–2	66	.834	.634	.021	.041	.407
	May 1	14 51	3	35	.795	.645	.021	.040	.379
1903	Nov. 9	1 16	3	41.5	405.798	419.621	—0.005	—0.009	825.405
	11	2 4	3–4	39.5	.837	.614	.004	.008	.439
	Dec. 6	2 45	3	25	.804	.590	.002	.004	.388
	7	2 22	3–4	28.5	.809	.612	.002	.004	.415
	11	2 47	2–3	25	.803	.594	.002	.004	.391
	15	3 4	3	15	.803	.601	.002	.003	.399
1904	Apr. 13	15 8	2–3	27	405.762	419.592	+0.009	+0.017	825.380
	16	15 45	2	25	.805	.572	.009	.017	.403
	18	16 41	3–4	36	.809	.585	.009	.017	.420
						Assumed Annual Proper Motion and Mean Sum:	—0.031	—0.060	825.404

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	13.807	—0.000	13.787	+1.0 x	—1.92 y	—0.68 z	= —0.009	—0.012
C.	.800	— .000	.780	1.0	1.92	0.68	— .016	— .019
C.	.850	+ .000	.831	1.0	1.91	0.67	+ .035	+ .031
C.	13.823	—0.000	13.819	+1.0 x	+1.83 y	—0.15 z	= +0.023	+0.025
C.	.777	— .001	.772	1.0	1.81	0.14	— .024	— .022
C.	.786	+ .000	.784	1.0	1.46	0.07	— .012	— .010
C.	.803	— .000	.801	1.0	1.43	0.07	+ .005	+ .007
C.	.791	+ .000	.789	1.0	1.32	0.06	— .007	— .005
C.	.798	+ .000	.797	1.0	1.21	0.05	+ .001	+ .003
C.	13.830	+0.000	13.838	+1.0 x	—1.89 y	+0.28 z	= +0.042	+0.039
C.	.767	+ .000	.775	1.0	1.91	0.29	— .021	— .024
C.	.776	— .000	.784	1.0	1.93	0.29	— .012	— .015
	Assumed Mean Difference:		13.796					

Normals:

$$+12.00x - 2.43y - 1.71z = +0.005$$
$$-2.43 + 35.94 + 1.40 = -0.055$$
$$-1.71 + 1.40 + 1.65 = -0.004$$

Solution:

	R	R	
x =	+0.0000	± 0.0050	Wt. 10.20
y =	—0.0015	± 0.0027	34.68
z =	—0.0009	± 0.0135	1.38

$[nn] = 0.00524$ $[vv] = 0.00515$ Prob. Error 1 Eq. = ± 0″.204

$$\pi = -0''.019 \pm 0''.034$$

Weisse 20^h, 1454	B. D. +2°, 4295	Mag. 8.2	R. A. 20^h 56.9^m	Decl. +2° 26′	Pos. Angle.
b	+2°, 4297	7·5	20 57·4	2 21	115°.4

Date.			Sid Time. h.	m.	Def.	Temp. °	Distance δ. R	P. M. Correction. R	Corrected Sum from Groom. 3689. R
1902	June	4	18	31	2	57	42.073	+0.004	562.110
		8	17	38	4	52	.074	.004	.095
		9	17	58	4	53	.079	.004	.088
1902	Nov.	28	0	20	3	32	42.074	+0.001	562.100*
	Dec.	1	0	25	4	34	.070	.001	.100*
		5	0	26	3	22	.059	.001	.103
		6	0	23	3	17	.071	.001	.118
		7	0	22	4	30	.052	.001	.100*
		8	0	22	4	16	.068	.001	.099
1903	Apr.	27	18	24	4	42	42.087	−0.002	562.124
	May	1	18	53	3	36	.073	.002	.073
		7	18	29	3	47	.084	.003	.096
			Assumed Annual Proper Motion and Mean Sum:					+0.007	562.101

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.				Residuals. R
S.	−0.001	42.076	+1.0 x	−0.58 y	−0.49 z	= +0.001	−0.004
S.	+ .000	.078	1.0	0.52	0.48	+ .003	− .001
S.	+ .001	.084	1.0	0.51	0.48	+ .009	+ .005
S.	+0.000	42.075	+1.0 x	+0.61 y	−0.09 z	= +0.000	+0.009
S.	+ .000	.071	1.0	0.59	0.08	− .004	+ .005
S.	− .000	.060	1.0	0.57	0.07	− .015	− .006
S.	− .001	.071	1.0	0.56	0.07	− .004	+ .005
S.	+ .000	.053	1.0	0.55	0.07	− .022	− .013
S.	+ .000	.069	1.0	0.53	0.07	− .006	+ .003
S.	−0.002	42.083	+1.0 x	−0.76 y	+0.32 z	= +0.008	+0.004
S.	+ .002	.073	1.0	0.75	0.33	− .002	− .006
S.	+ .000	.081	1.0	0.74	0.35	+ .006	+ .002
Assumed Mean Distance:		42.075					

Normals:

$$+12.00\,x - 0.45\,y - 0.90\,z = -0.026\ (R)$$
$$-0.45 + 4.49 - 0.24 = -0.045$$
$$-0.90 - 0.24 + 1.05 = +0.001$$

Solution:

$x = -0.0027 \pm 0.0013$ (R) Wt. 11.1
$y = -0.0105 \pm 0.0023$ (R) 4.4
$z = -0.0042 \pm 0.0048$ (R) 1.0

$[nn] = 0.00098$ $[vv] = 0.00046$ Prob. Error 1 Eq. $= \pm 0''.061$

$$\pi = -0''.134 \pm 0''.029$$

* These sums are the mean value of the December 1902 group for Groom. 3689.

Lal. 40844	B. D. +6°, 4741	Mag. 8.8	R. A. $20^h\ 58.7^m$	Decl. +6° 31′	Pos. Angle.
a	+6°, 4736	8.2	20 56.7	6 25	253°.9
b	+6°, 4752	8.2	21 0.8	6 51	62°.1

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June 10	18	8	2	52.5	103.213	207.848	−0.036	+0.061	311.086
	12	17	47	2–3	72.5	.207	.880	.036	.061	.112
	13	18	8	–	74.5	.208	.850	.036	.061	.083
1892	Dec. 20	23	42	–	24	103.142	207.872	−0.028	+0.049	311.035
	22	23	43	2–3	20	.184	.900	.028	.049	.105
	26	23	58	3	19.5	.166	.873	.028	.048	.059
1895	Nov. 4	23	51	2–3	41.5	103.132	207.955	+0.012	−0.020	311.079
	19	0	29	2–3	48.5	.129	.964	.012	.021	.084
	29	0	30	2	35.5	.149	.949	.013	.022	.089
1898	June 24	18	14	2–3	65.5	103.115	208.006	+0.049	−0.084	311.086
	29	18	7	–	69.5	.099	207.994	.049	.084	.058
	Assumed Annual Proper Motion and Mean Sum:							−0.014	+0.024	311.080

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	104.635	−0.002	104.730	$+1.0\,x$	$-1.75\,y$	$-2.56\,z$	$= -0.040$	−0.018
E.	.673	− .011	.759	1.0	1.72	2.55	− .011	+ .011
E.	.642	− .001	.738	1.0	1.70	2.55	− .032	− .010
E.	104.730	+0.015	104.822	$+1.0\,x$	$+1.53\,y$	$-2.03\,z$	$= +0.052$	+0.034
E.	.716	− .008	.785	1.0	1.49	2.03	+ .015	− .003
E.	.707	+ .007	.790	1.0	1.42	2.01	+ .020	+ .003
E.	104.823	+0.000	104.791	$+1.0\,x$	$+1.96\,y$	$+0.84\,z$	$= +0.021$	−0.004
E.	.835	− .001	.801	1.0	1.92	0.88	+ .031	+ .006
E.	.800	− .003	.762	1.0	1.87	0.91	− .008	− .032
E.	104.891	−0.002	104.756	$+1.0\,x$	$-1.49\,y$	$+3.48\,z$	$= -0.014$	+0.001
E.	.895	+ .007	.769	1.0	1.38	3.49	− .001	+ .013
	Assumed Mean Difference:		104.770					

Normals:

			R	
$+11.00\,x$	$+2.15\,y$	$-4.13\,z$	$= +0.033$	Wt. 10.6
$+2.15$	$+30.20$	$+0.08$	$= +0.373$	30.2
-4.13	$+0.08$	$+58.42$	$= +0.021$	56.9

Solution: R R

$x = +0.0008 \pm 0.0038$

$y = +0.0123 \pm 0.0023$

$z = +0.0006 \pm 0.0017$

$[nn] = 0.00772$ $[vv] = 0.00296$ Prob. Error 1 Eq. $= \pm 0''.164$

$\pi = +0''.156 \pm 0''.029$

Weisse 21^h, 97	B. D. +17°, 4519	Mag. 7.3	R. A. 21^h 5.3^m	Decl. +17° 10′	Pos. Angle.
a	+16°, 4469	8.2	21 3.8	16 23	204°.4
b	+18°, 4743	7.5	21 8.5	18 1	41°.7

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 June 7	18 34	3	51	240.854	326.838	−0.198	+0.144	567.638
10	17 48	2	53.5	.847	.826	.197	.143	.619
13	17 50	–	74	.851	.823	.196	.143	.621
1892 Dec. 20	23 58	–	24	240.820	326.836	−0.156	+0.114	567.614
22	23 59	2–3	20	.836	.826	.156	.114	.620
26	0 13	3	9	.808	.853	.155	.113	.619
1895 Nov. 4	0 13	2–3	40	240.609	326.995	+0.065	−0.047	567.622
17	0 57	2–3	47.5	.565	327.017	.068	.049	.601
27	0 50	2	36	.599	326.969	.070	.051	.589
1898 June 24	17 54	3	65.5	240.389	327.186	+0.268	−0.195	567.648
29	17 55	–	69.5	.383	.174	.269	.195	.631
Assumed Annual Proper Motion and Mean Sum:						−0.077	+0.056	567.620

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	85.984	−0.003	86.323	$+1.0x$	$-1.72y$	$-2.57z$ =	+0.023	+0.005
E.	.979	+ .000	.319	1.0	1.72	2.56	+ .019	+ .001
E.	.972	− .000	.311	1.0	1.72	2.55	+ .011	− .007
E.	86.016	+0.001	86.287	$+1.0x$	$+1.64y$	$-2.03z$ =	−0.013	+0.002
E.	85.990	+ .000	.260	1.0	1.63	2.03	− .040	− .025
E.	86.045	+ .000	.313	1.0	1.62	2.01	+ .013	+ .028
E.	86.386	−0.000	86.274	$+1.0x$	$+1.42y$	$+0.84z$ =	−0.026	−0.018
E.	.452	+ .003	.338	1.0	1.58	0.88	+ .038	+ .048
E.	.370	+ .005	.254	1.0	1.66	0.91	− .046	− .035
E.	86.797	−0.004	86.330	$+1.0x$	$-1.68y$	$+3.48z$ =	+0.030	+0.003
E.	.791	− .002	.325	1.0	1.62	3.49	+ .025	− .000
Assumed Mean Difference:			86.300					

Normals:

			R
$+11.00x$	$+1.09y$	$-4.15z$ =	+0.034
$+1.09$	$+29.53$	-4.04 =	−0.299
-4.15	-4.04	$+58.53$ =	+0.106

Solution:

	R	R	
x =	+0.0044	± 0.0053	Wt. 10.7
y =	−0.0100	± 0.0032	29.4
z =	+0.0015	± 0.0023	56.5

$[nn] = 0.00871$ $[vv] = 0.00533$ Prob. Error 1 Eq. = ± 0″.220

$\pi = -0''.127 \pm 0''.041$

ρ Cygni	B. D. +44°, 3865	Mag. 4.1	R. A. 21h 28.5m	Decl. +44° 57′	Pos. Angle.
a	+44°, 3814	7.8	21 21.6	44 16	240°.5
b	+45°, 3640	8.3	21 36.8	45 37	65°.2

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	June 6	17	8	2	62.5	403.616	452.591	0.000	0.000	856.207
	18	16	59	3	55.5	.618	.570	.000	.000	.188
	24	16	58	2–3	71	.608	.587	.000	.000	.195
	25	17	25	2–3	68	.625	.589	.000	.000	.214
1901	Nov. 27	1	39	3–4	16.5	403.593	452.558	0.000	0.000	856.151
	28	1	31	3–4	14.5	.552	.559	.000	.000	.111
	Dec. 5	2	26	3–4	10	.597	.584	.000	.000	.181
	12	2	18	3–4	34	.622	.594	.000	.000	.216
	18	2	49	2	13	.578	.575	.000	.000	.153
	21	2	39	2	13	.605	.577	.000	.000	.182
1902	May 16	17	11	3	49	403.614	452.597	0.000	0.000	856.211
	17	16	48	2–3	56.5	.580	.574	.000	.000	.154
	June 4	17	2	3	57.5	.622	.589	.000	.000	.211
	19	17	34	2	62.5	.613	.582	.000	.000	.195
								Assumed Annual Proper Motion and Mean Sum:	0.000	0.000	856.183

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	48.975	−0.001	48.974	$+1.0\,x$	$-1.99\,y$	$-0.57\,z$ =	−0.003	+0.007
C.	.952	− .000	.952	1.0	1.94	0.54	− .025	− .015
C.	.979	− .001	.978	1.0	1.88	0.52	+ .001	+ .011
C.	.964	− .002	.962	1.0	1.87	0.52	− .015	− .005
C.	48.965	+0.002	48.967	$+1.0\,x$	$+1.93\,y$	$-0.10\,z$ =	−0.010	−0.017
C.	49.007	+ .004	49.011	1.0	1.94	0.09	+ .034	+ .027
C.	48.987	+ .000	48.987	1.0	1.95	0.07	+ .010	+ .003
C.	.972	− .002	.970	1.0	1.91	0.06	− .007	− .014
C.	.997	+ .002	.999	1.0	1.87	0.04	+ .022	+ .014
C.	.972	+ .000	.972	1.0	1.85	0.03	− .005	− .012
C.	48.983	−0.002	48.981	$+1.0\,x$	$-1.93\,y$	$+0.37\,z$ =	+0.004	+0.004
C.	.994	+ .002	.996	1.0	1.94	0.37	+ .019	+ .019
C.	.967	− .002	.965	1.0	1.99	0.42	− .012	− .012
C.	.969	− .001	.968	1.0	1.93	0.46	− .009	− .010
			Assumed Mean Difference:	48.977				

Normals:

			R	
$+14.00\,x$	$-4.02\,y$	$-0.92\,z$	= +0.004	
-4.02	$+51.76$	$+0.23$	= +0.161	
-0.92	$+0.23$	$+1.85$	= +0.019	

Solution:

	R	R	
x	= +0.0019	± 0.0029	Wt. 13.24
y	= +0.0032	± 0.0015	50.60
z	= +0.0106	± 0.0078	1.79

$[nn] = 0.00337$ $[vv] = 0.00265$ Prob. Error 1 Eq. = ±0.″132

$\pi = +0.″040 \pm 0.″019$

72 Cygni	B. D. +37°, 4359	Mag. 5.0	R. A. $21^h\ 28.9^m$	Decl. +37° 53′	Pos. Angle.
a	+36°, 4580	8.0	21 23.1	36 57	230°.3
b	+38°, 4576	7.8	21 35.4	38 49	53°.9

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901	June 10	17	4	2	57.5	419.598	449.870	0.000	0.000	869.468
	17	17	27	3	57	.598	.862	.000	.000	.460
	18	17	45	3–4	53	.608	.877	.000	.000	.485
	24	17	37	2–3	70	.588	.845	.000	.000	.433
1901	Nov. 22	1	7	2	32.5	419.564	449.813	0.000	0.000	869.377
	30	1	49	2	22	.546	.825	.000	.000	.371
	Dec. 5	1	38	3–4	10.5	.596	.830	.000	.000	.426
	6	2	24	3	10.5	.562	.784	.000	.000	.346
1902	Jan. 17	1	55	1–2	19	.563	.799	.000	.000	.362
	19	2	2	3	24	.584	.793	.000	.000	.377
1902	May 16	16	25	3	51	419.590	449.832	0.000	0.000	869.422
	17	17	28	2–3	54	.567	.818	.000	.000	.385
	June 5	16	59	2	53.5	.606	.843	.000	.000	.449
	18	17	16	3–4	60.5	.615	.829	.000	.000	.444
						Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	869.415

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	30.272	−0.002	30.270	$+1.0\,x$	$-2.00\,y$	$-0.56\,z$	$= +0.025$	+0.004
C.	.264	− .002	.262	1.0	2.01	0.54	+ .017	− .003
C.	.269	− .002	.267	1.0	2.01	0.54	+ .022	+ .002
C.	.257	− .001	.256	1.0	1.96	0.52	+ .011	− .008
C.	30.249	+0.001	30.250	$+1.0\,x$	$+1.88\,y$	$-0.11\,z$	$= +0.005$	+0.008
C.	.279	+ .002	.281	1.0	1.93	−0.09	+ .036	+ .040
C.	.234	− .000	.234	1.0	1.96	−0.07	− .011	− .007
C.	.222	+ .002	.224	1.0	1.96	−0.07	− .021	− .016
C.	.236	+ .002	.238	1.0	1.54	+0.04	− .007	+ .000
C.	.209	+ .001	.210	1.0	1.51	+0.05	− .035	− .028
C.	30.242	−0.000	30.242	$+1.0\,x$	$-1.88\,y$	$+0.37\,z$	$= -0.003$	+0.007
C.	.251	+ .001	.252	1.0	1.88	0.37	+ .007	+ .017
C.	.237	− .001	.236	1.0	1.99	0.42	− .009	+ .003
C.	.214	− .001	.213	1.0	2.01	0.46	− .032	− .019
	Assumed Mean Difference:		30.245					

R

Normals: $+14.00\,x - 4.96\,y - 0.79\,z = +0.005$

$-4.96 + 50.56 + 0.65 = -0.124$

$-0.79 + 0.65 + 1.86 = -0.061$

Solution:	R	R	Wt.
$x =$	-0.0023	± 0.0033	13.22
$y =$	-0.0023	± 0.0017	48.73
$z =$	-0.0033	± 0.0089	1.82

$[nn] = 0.00584$ $[vv] = 0.00354$ Prob. Error 1 Eq. $= \pm 0''.153$

$\pi = -0''.029 \pm 0''.022$

Lal. 42883–5	B. D. +29°, 4550	Mag. 7.4	R. A. $21^h\ 52.3^m$	Decl. +29° 8′	Pos. Angle.
a	+28°, 4232	8.3	21 48.5	28 40	240°.4
b	+29°, 4568	7.0	21 56.7	29 31	69°.1

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	June 20	18	29	–	67	269.509	297.317	−0.019	+0.023	566.830
	23	18	36	2	76.5	.493	.343	.019	.023	.840
	July 5	18	43	3–4	61	.480	.322	.018	.021	.805
1894	Nov. 22	1	18	2	36	269.468	297.334	−0.004	+0.005	566.803
	Dec. 6	2	29	2–3	32	.491	.337	.003	.003	.828
	17	1	48	3–4	36	.443	.326	.001	.002	.770
1895	Nov. 11	1	17	3	28	269.427	297.387	+0.031	−0.037	566.808
	30	0	53	2–3	31.	.431	.370	.033	.039	.795
1896	May 10	18	16	2–3	66	269.400	297.400	+0.049	−0.058	566.791
	12	18	9	4	53	.459	.408	.049	.058	.858
	13	17	54	3	48	.429	.397	.049	.058	.817
	Assumed Annual Proper Motion and Mean Sum:							−0.036	+0.043	566.812

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	27.808	−0.001	27.849	$+1.0\,x$	$-1.93\,y$	$-0.54\,z$	$= -0.023$	−0.023
C.	.850	− .001	.891	1.0	1.90	0.53	+ .019	+ .019
C.	.842	+ .000	.881	1.0	1.75	0.49	+ .009	+ .009
C.	27.866	+0.000	27.875	$+1.0\,x$	$+1.92\,y$	$-0.11\,z$	$= +0.003$	−0.001
C.	.846	− .001	.851	1.0	1.96	0.07	− .021	− .025
C.	.883	+ .002	.888	1.0	1.88	0.04	+ .016	+ .012
C.	27.960	+0.000	27.892	$+1.0\,x$	$+1.80\,y$	$+0.86\,z$	$= +0.020$	+0.019
C.	.939	+ .001	.868	1.0	1.96	0.91	− .004	− .005
C.	28.000	+0.001	27.894	$+1.0\,x$	$-1.86\,y$	$+1.35\,z$	$= +0.022$	+0.027
C.	27.949	− .002	.840	1.0	1.89	1.36	− .032	− .027
C.	.968	− .000	.861	1.0	1.91	1.36	− .011	− .006
	Assumed Mean Difference:		27.872					

Normals:

$$\begin{aligned} +11.00\,x - 1.72\,y + 4.06\,z &= -0.002 \\ -1.72\,x + 39.21\,y - 1.87\,z &= +0.055 \\ +4.06\,x - 1.87\,y + 7.91\,z &= -0.018 \end{aligned}$$

Solution:

	R	R	Wt.
$x =$	$+0.0009$	± 0.0048	8.91
$y =$	$+0.0013$	± 0.0023	38.70
$z =$	-0.0024	± 0.0057	6.37

$[nn] = 0.00372$ $\quad [vv] = 0.00361$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.182$

$$\pi = +0''.017 \pm 0''.029$$

Groom. 3689	B. D. +52°, 3112	Mag. 7.9	R. A. 22h 1.5m	Decl. +52° 26′	Pos. Angle.
a	+53°, 2768	7.9	21 56.4	53 6	311°.0
b	+52°, 3143	8.2	22 7.6	52 12	103°.2

Date.		Sid. Time. h.	m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1902	June 4	18	3	2	58	287.173	274.933	−0.010	+0.014	562.110
	8	18	2	4	52	.192	.899	.010	.014	.095
	9	17	28	4	53	.171	.913	.010	.014	.088
1902	Dec. 5	2	29	3	16	287.169	274.932	−0.001	+0.002	562.102
	6	2	19	3	16	.175	.942	.001	.002	.118
	8	2	15	4	13	.169	.929	.001	.002	.099
	14	2	52	2	10	.158	.920	.001	.002	.079
1903	Apr. 27	17	59	4	43	287.168	274.958	+0.007	−0.009	562.124
	May 1	17	24	3	36	.147	.928	.007	.009	.073
	7	17	1	3	47	.170	.929	.007	.010	.096
								−0.021	+0.028	562.098

Assumed Annual Proper Motion and Mean Sum: −0.021 +0.028 562.098

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	12.240	−0.000	12.216	$+1.0x$	$+1.21y$	$-0.49z$	$= -0.019$	−0.022
S.	.293	+ .000	.269	1.0	1.13	0.48	+ .034	+ .031
S.	.258	+ .000	.234	1.0	1.11	0.48	− .001	− .004
S.	12.237	−0.000	12.234	$+1.0x$	$-1.20y$	$-0.07z$	$= -0.001$	+0.000
S.	.233	− .000	.230	1.0	1.18	0.07	− .005	− .004
S.	.240	− .000	.237	1.0	1.13	0.07	+ .002	+ .003
S.	.238	+ .000	.235	1.0	0.98	0.05	+ .000	+ .001
S.	12.210	−0.001	12.225	$+1.0x$	$+1.68y$	$+0.32z$	$= -0.010$	−0.014
S.	.219	+ .001	.236	1.0	1.64	0.33	+ .001	− .003
S.	.241	+ .000	.258	1.0	1.59	0.35	+ .023	+ .019

Assumed Mean Difference: 12.235

Normals:

			R	
$+10.00x$	$+3.87y$	$-0.71z$	$= +0.024$	Wt. 8.5
$+3.87$	$+17.08$	$+0.27$	$= +0.040$	15.3
-0.71	$+3.87$	$+1.03$	$= -0.002$	1.0

Solution:

	R	R
$x =$	$+0.0015$	± 0.0039
$y =$	$+0.0020$	± 0.0029
$z =$	-0.0010	± 0.0111

$[nn] = 0.00217$ $[vv] = 0.00186$ Prob. Error 1 Eq. $= \pm 0''.144$

$\pi = +0''.026 \pm 0''.037$

Lal. 43492	B. D. +12°, 4797	Mag. 7.0	R. A. $22^h\ 10.0^m$	Decl. +12° 10′	Pos. Angle.
a	+12°, 4793	7·5	22 9.6	12 13	282°.2

	Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	P. M. Correction. R	Corrected Sum from Lal. 42883-5. R
1894	June 20	19 1	–	66.5	34.017	+0.028	566.830
	23	19 1	2	76	.030	.028	.840
	July 5	19 9	3–4	61	.000	.025	.805
1894	Nov. 22	1 46	2	35·5	34.040	+0.006	566.803
	Dec. 6	2 3	2–3	32·5	.064	.004	.828
	17	1 19	3–4	36.5	.023	.002	.770
1895	Nov. 11	1 44	3	27.5	34.016	–0.045	566.808
	30	0 24	2–3	32	.120	.047	.795
1896	May 10	18 50	2–3	66.5	34.138	–0.070	566.791
	12	18 38	4	53	.138	.071	.858
	13	18 24	3	47	.134	.071	.817
	Assumed Annual Proper Motion and Mean Sum:					+0.052	566.812

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	–0.001	34.044	$+1.0\,x$	$+0.71\,y$	$-0.54\,z$	= +0.000	–0.005
C.	– .002	.056	1.0	0.69	0.53	+ .012	+ .008
C.	+ .000	.025	1.0	0.56	0.49	– .019	– .022
C.	+0.001	34.047	$+1.0\,x$	$-0.83\,y$	$-0.11\,z$	= +0.003	+0.013
C.	– .001	.067	1.0	0.78	0.07	+ .023	+ .032
C.	+ .003	.028	1.0	0.70	0.04	– .016	– .008
C.	+0.000	33.971	$+1.0\,x$	$-0.82\,y$	$+0.86\,z$	= –0.073	–0.068
C.	+ .001	34.074	1.0	0.81	0.91	+ .030	+ .034
C.	+0.001	34.069	$+1.0\,x$	$+0.85\,y$	$+1.35\,z$	= +0.025	+0.009
C.	– .003	.064	1.0	0.85	1.36	+ .020	+ .004
C.	– .000	.063	1.0	0.85	1.36	+ .019	+ .003
	Assumed Mean Distance:	34.044					

Normals:

			R	
+ 11.00 *x*	+ 0.57 *y*	+ 4.06 *z*	= + 0.024	
+ 0.57	+ 6.58	+ 1.17	= + 0.078	
+ 4.06	+ 1.17	+ 7.92	= + 0.053	

Solution:

	R	R	
x =	– 0.0003	± 0.0070	Wt. 8.92
y =	+ 0.0110	± 0.0083	6.41
z =	+ 0.0052	± 0.0083	6.28

$[nn] = 0.00891$ $[vv] = 0.00778$ Prob. Error 1 Eq. = ± 0″.267

$\pi = + 0''.140 \pm 0''.106$

31 Cephei	B. D. +72°, 1049	Mag. 5.5	R. A. $22^h\ 32.2^m$	Decl. +72° 54′	Pos. Angle.
a	+71°, 1139	8.2	22 24.7	71 30	202°.3
b	+73°, 996	8.4	22 44.5	73 54	40°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1901 June 29	17 26	–	—	425.746	379.098	0.000	0.000	804.844
30	17 39	3	78	.744	.106	.000	.000	.850
Aug. 1	17 52	3	66	.734	.083	.000	.000	.817
4	17 39	3–4	66.5	.710	.113	.000	.000	.823
1902 Jan. 3	3 10	2–3	13.5	425.723	379.067	0.000	0.000	804.790
13	2 21	3–4	17.5	.699	.089	.000	.000	.788
15	2 19	2	28	.704	.079	.000	.000	.783
17	2 30	1–2	19	.716	.049	.000	.000	.765
19	2 43	3	23	.717	.052	.000	.000	.769
1902 June 4	16 11	3	59	425.742	379.090	0.000	0.000	804.832
5	16 5	2	54.5	.724	.077	.000	.000	.801
18	16 28	3–4	60.5	.758	.128	.000	.000	.886
19	16 51	2	63	.719	.094	.000	.000	.813
				Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	804.812

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	46.648	−0.002	46.646	$+1.0\,x$	$+1.74\,y$	$-0.51\,z$	$= +0.007$	+0.013
C.	.638	− .002	.636	1.0	1.75	0.51	− .003	+ .003
C.	.651	− .000	.651	1.0	1.97	0.42	+ .012	+ .019
C.	.597	− .001	.596	1.0	1.96	0.41	− .043	− .037
C.	46.656	+0.001	46.657	$+1.0\,x$	$-1.78\,y$	$+0.01\,z$	$= +0.018$	+0.010
C.	.610	+ .001	.611	1.0	1.87	0.03	− .028	− .036
C.	.625	+ .002	.627	1.0	1.88	0.04	− .012	− .020
C.	.667	+ .003	.670	1.0	1.89	0.04	+ .031	+ .023
C.	.665	+ .002	.667	1.0	1.90	0.05	+ .028	+ .020
C.	46.652	−0.001	46.651	$+1.0\,x$	$+1.30\,y$	$+0.42\,z$	$= +0.012$	+0.014
C.	.647	+ .001	.648	1.0	1.32	0.42	+ .009	+ .011
C.	.630	− .004	.626	1.0	1.57	0.46	− .013	− .010
C.	.625	− .000	.625	1.0	1.59	0.46	− .014	− .011
	Assumed Mean Difference:		46.639					

Normals:

			R	
$+13.00\,x$	$+3.88\,y$	$+0.08\,z$	$= +0.004$	Wt. 12.60
$+3.88$	$+39.61$	-1.20	$= -0.136$	37.55
$+0.08$	-1.20	$+1.65$	$= +0.008$	1.61

Solution:

	R	R
$x =$	$+0.0014$	± 0.0034
$y =$	-0.0035	± 0.0025
$z =$	$+0.0025$	± 0.0120

$[nn] = 0.00564$ $[vv] = 0.00513$ Prob. Error 1 Eq. $= \pm 0''.193$

$\pi = -0''.044 \pm 0''.031$

Piazzi 22^h, 214	B. D. $+29°$, 4753	Mag. 7.2	R. A. $22^h\ 38.8^m$	Decl. $+29°\ 41$	Pos. Angle.
a	$+29°$, 4715	7.4	22 31.1	29 10	252°.6
b	$+29°$, 4797	7.4	22 46.7	30 0	80°.0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	June 23	19 30	2	75	494.919	494.584	−0.012	+0.021	989.512
	July 7	19 34	2	56	.901	.560	.011	.019	.469
	10	18 25	3–4	61.5	.920	.565	.011	.019	.493
1894	Dec. 5	1 55	1–2	27.5	494.887	494.573	−0.002	+0.003	989.461
	20	2 55	2–3	30.5	.883	.551	.001	.001	.434
	21	2 54	3	31	.875	.546	.001	.001	.421
1895	Dec. 3	2 38	3–4	21	494.877	494.615	+0.021	−0.036	989.477
	15	2 33	3–4	32.5	.865	.587	.022	.037	.437
	27	2 31	2–3	31	.842	.601	.023	.039	.427
1896	May 10	19 14	2–3	67	494.872	494.646	+0.031	−0.053	989.496
	12	19 7	4	52.5	.865	.644	.031	.053	.487
	13	18 53	3	46	.865	.622	.031	.053	.465
						Assumed Annual Proper Motion and Mean Sum:	−0.023	+0.039	989.465

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	0.335	−0.000	0.302	$+1.0\,x$	$+1.90\,y$	$-0.53\,z$	$= -0.015$	−0.011
C.	.341	− .000	.311	1.0	1.74	0.49	− .006	− .002
C.	.355	− .000	.325	1.0	1.70	0.48	+ .008	+ .011
C.	0.314	+0.000	0.309	$+1.0\,x$	$-1.90\,y$	$-0.07\,z$	$= -0.008$	−0.012
C.	.332	+ .000	.330	1.0	1.86	0.03	+ .013	+ .009
C.	.329	+ .000	.327	1.0	1.85	0.03	+ .010	+ .006
C.	0.262	−0.000	0.319	$+1.0\,x$	$-1.90\,y$	$+0.92\,z$	$= +0.002$	−0.002
C.	.278	+ .000	.337	1.0	1.88	0.95	+ .020	+ .016
C.	.241	+ .000	.303	1.0	1.82	0.99	− .014	− .017
C.	0.226	−0.000	0.310	$+1.0\,x$	$+1.77\,y$	$+1.35\,z$	$= -0.007$	−0.004
C.	.221	− .000	.305	1.0	1.79	1.36	− .012	− .009
C.	.243	+ .000	.327	1.0	1.80	1.36	+ .010	+ .013
	Assumed Mean Difference: 0.317							

Normals:

R				
$+12.00\,x$	$-0.51\,y$	$+5.30\,z$	$=+0.001$	
-0.51	$+40.04$	-0.49	$=-0.080$	
$+5.30$	-0.49	$+9.01$	$=+0.002$	

Solution:

	R	R	
$x =$	-0.0000	± 0.0028	Wt. 8.89
$y =$	-0.0020	± 0.0013	40.01
$z =$	$+0.0001$	± 0.0033	6.66

$[nn] = 0.00155$ $[vv] = 0.00135$ Prob. Error 1 Eq. $= \pm 0''.107$

$\pi = -0''.025 \pm 0''.017$

ξ Pegasi	B. D. +11°, 4875	Mag. 4.8	R. A. 22h 39.5m	Decl. +11° 26′	Pos. Angle.
a	+10°, 4811	7.9	22 38.0	10 56	216°.3
b	+12°, 4889	8.4	22 40.9	12 15	23°.3

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June 25	19	56	1–2	59	175.817	254.014	−0.050	+0.050	429.831
	July 6	19	21	3	57	.804	.015	.050	.050	.819
	17	20	8	–	55	.818	253.984	.049	.049	.802
1893	Jan. 10	1	32	2–3	4.5	175.821	254.056	−0.040	+0.040	429.877
	11	1	29	–	4	.763	.026	.039	.039	.789
	13	2	37	2–3	5	.767	.009	.039	.039	.776
1897	Jan. 6	1	12	2–3	25.5	175.703	254.113	+0.040	−0.040	429.816
	7	1	23	2	25.5	.733	.110	.040	.040	.843
	8	1	29	3	25	.708	.093	.040	.040	.801
1897	May 22	19	22	3	47.5	175.719	254.102	+0.048	−0.048	429.821
	31	19	0	–	49	.688	.118	.048	.048	.806
	June 9	18	47	3–4	50.5	.703	.095	.049	.049	.798
	Assumed Annual Proper Motion and Mean Sum :							−0.020	+0.020	429.815

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	78.197	−0.003	78.294	$+1.0\,x$	$-1.62\,y$	$-2.52\,z$	$= -0.013$	−0.003
C.	.211	− .001	.310	1.0	1.57	2.49	+ .003	+ .013
C.	.166	+ .002	.266	1.0	1.48	2.46	− .041	− .032
C.	78.235	−0.011	78.304	$+1.0\,x$	$+1.48\,y$	$-1.98\,z$	$= -0.003$	−0.013
C.	.263	+ .005	.346	1.0	1.47	1.97	+ .039	+ .029
C.	.242	+ .007	.327	1.0	1.46	1.97	+ .020	+ .010
C.	78.410	−0.000	78.330	$+1.0\,x$	$+1.51\,y$	$+2.01\,z$	$= +0.023$	+0.011
C.	.377	− .005	.292	1.0	1.50	2.02	− .015	− .026
C.	.385	+ .003	.308	1.0	1.49	2.02	+ .001	− .010
C.	78.383	−0.001	78.286	$+1.0\,x$	$-1.45\,y$	$+2.39\,z$	$= -0.021$	−0.014
C.	.430	+ .002	.336	1.0	1.56	2.41	+ .029	+ .037
C.	.392	+ .003	.297	1.0	1.61	2.44	− .010	− .002
	Assumed Mean Difference :		78.307					

Normals :

$$+12.00\,x - 0.38\,y - 0.10\,z = +0.012$$
$$-0.38\,x + 27.62\,y + 0.83\,z = +0.174$$
$$-0.10\,x + 0.83\,y + 59.95\,z = +0.030$$

Solution :

	R	R	
x	$= +0.0012$	± 0.0045	Wt. 11.99
y	$= +0.0063$	± 0.0030	27.60
z	$= +0.0004$	± 0.0020	59.93

$[nn] = 0.00593$ $\quad [vv] = 0.00481$ $\quad$ Prob. Error 1 Eq. $= \pm$ 0″.198

$$\pi = +0''.080 \pm 0''.038$$

σ Pegasi	B. D. +9°, 5122	Mag. 5.0	R. A. $22^h\ 45.1^m$	Decl. +9° 5′	Pos. Angle.
b	+9°, 5125	7·5	22 45·3	9 27	9.°0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance δ. R	P. M. Correction. R	Corrected Sum from ξ Pegasi. R
1892	June 25	20 34	1–2	59	111.649	−0.040	429.831
	July 6	19 46	3	57	.657	.040	.819
	17	20 36	–	54·5	.632	.039	.802
1893	Jan. 10	2 7	2–3	3	111.635	−0.032	429.877
	11	1 58	–	3	.617	.032	.789
	13	2 11	2–3	5·5	.650	.031	.776
1897	Jan. 6	1 36	2–3	25	111.568	+0.032	429.816
	7	1 46	2	25·5	.588	.032	.843
	8	1 3	3	25	.569	.032	.801
1897	May 22	19 58	3	48	111.560	+0.038	429.821
	31	19 48	–	48	.566	.038	.806
	June 9	19 37	3–4	50·5	.552	.039	.798
		Assumed Annual Proper Motion and Mean Sum:				−0.016	429.815

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.			R	Residuals. R
C.	−0.004	111.605	+1.0 x	−0.59 y	−2.52 z =	+0.002	+0.001
C.	− .001	.616	1.0	0.59	2.49	+ .013	+ .012
C.	+ .003	.596	1.0	0.56	2.46	− .007	− .007
C.	−0.015	111.588	+1.0 x	+0.57 y	−1.98 z =	−0.015	−0.016
C.	+ .004	.589	1.0	0.57	1.97	− .014	− .015
C.	+ .010	.629	1.0	0.56	1.97	+ .026	+ .024
C.	−0.000	111.600	+1.0 x	+0.57 y	+2.01 z =	−0.003	−0.003
C.	− .007	.613	1.0	0.57	2.02	+ .010	+ .010
C.	+ .003	.604	1.0	0.57	2.02	+ .001	+ .000
C.	−0.001	111.597	+1.0 x	−0.47 y	+2.39 z =	−0.006	−0.005
C.	+ .002	.606	1.0	0.52	2.41	+ .003	+ .004
C.	+ .004	.595	1.0	0.55	2.44	− .008	− .007
	Assumed Mean Distance:	111.603					

Normals:

			R
+ 12.00 x	+ 0.13 y	− 0.10 z	= + 0.002
+ 0.13	+ 3.71	+ 0.73	= + 0.003
− 0.10	+ 0.73	+ 59.95	= − 0.024

Solution:

	R	R	
x =	+ 0.0002	± 0.0025	Wt. 12.00
y =	+ 0.0008	± 0.0046	3.70
z =	− 0.0004	± 0.0011	59.81

$[nn] = 0.00154$ $[vv] = 0.00152$ Prob. Error 1 Eq. = ± 0.″111

$\pi = + 0.''011 \pm 0.''058$

Fed. 4371	B. D. +67°, 1498	Mag. 7.5	R. A. $22^h\ 59.4^m$	Decl. +67° 38′	Pos. Angle.
a	+67°, 1482	7.5	22 50.8	67 28	259°.3
b	+67°, 1508	8.4	23 7.0	67 52	72°.2

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894 July 25	19 5	3	71.5	239.905	212.913	+0.018	−0.020	452.816
1894 Dec. 6	3 8	2–3	31	239.914	212.892	+0.003	−0.003	452.806
20	3 30	2–3	30	.920	.909	.001	.001	.829
1895 Jan. 13	4 35	2–3	25.5	.931	.876	.001	.001	.807
1895 Dec. 3	3 17	3–4	20	239.951	212.845	−0.038	+0.041	452.799
1896 Jan. 1	4 25	2	24	.956	.848	.041	.045	.808
3	4 22	2–3	24.5	.961	.862	.041	.046	.828
1896 May 15	18 27	2–3	59	239.998	212.812	−0.056	+0.062	452.816
22	18 54	3	62	.975	.832	.057	.063	.813
22	18 28	2–3	51	.993	.835	.057	.063	.834
Assumed Annual Proper Motion and Mean Sum:						+0.041	−0.045	452.816

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	26.992	+0.000	27.030	$+1.0\,x$	$+1.52\,y$	$-0.44\,z$	$= -0.001$	−0.009
C.	27.022	+0.001	27.029	$+1.0\,x$	$-1.81\,y$	$-0.07\,z$	$= -0.002$	+0.002
C.	.011	− .001	.012	1.0	1.85	−0.03	− .019	− .015
C.	.055	+ .001	.058	1.0	1.66	+0.03	+ .027	+ .031
C.	27.106	+0.001	27.028	$+1.0\,x$	$-1.79\,y$	$+0.92\,z$	$= -0.003$	+0.001
C.	.108	+ .000	.022	1.0	1.81	1.00	− .009	− .004
C.	.099	− .001	.011	1.0	1.79	1.01	− .020	− .015
C.	27.186	+0.000	27.068	$+1.0\,x$	$+1.60\,y$	$+1.37\,z$	$= +0.037$	+0.029
C.	.143	+ .000	.023	1.0	1.73	1.39	− .008	− .017
C.	.158	− .001	.037	1.0	1.74	1.39	+ .006	− .003
Assumed Mean Difference:	27.031							

Normals:

$$\begin{aligned} +10.00\,x - 4.12\,y + 6.57\,z &= +0.008 \\ -4.12\,x + 30.03\,y + 1.21\,z &= +0.104 \\ +6.57\,x + 1.21\,y + 8.80\,z &= +0.019 \end{aligned}$$

Solution:

	R	R	Wt.
$x =$	+0.0026	± 0.0064	4.25
$y =$	+0.0038	± 0.0026	24.91
$z =$	−0.0003	± 0.0066	3.95

$[nn] = 0.00305$ $[vv] = 0.00263$ Prob. Error 1 Eq. = ± 0.″166

$\pi = +0.''048 \pm 0.''033$

γ Piscium	B. D. +2°, 4648	Mag. 3.8	R. A. $23^h\ 9.6^m$	Decl. +2° 29′	Pos. Angle.
a	+1°, 4694	8.2	23 5.2	1 54	242°.0
b	+2°, 4658	8.0	23 15.4	2 58	72°.1

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	June	25	21	13	1–2	58.5	356.579	421.667	+0.126	−0.149	778.223
	July	6	20	18	3	56.5	.537	.673	.124	.147	.187
		17	21	37	–	53	.578	.639	.123	.145	.195
1893	Jan.	11	2	39	–	2	356.618	421.612	+0.098	−0.116	778.212
		13	1	32	2–3	6	.577	.581	.098	.116	.140
		14	1	38	2–3	9.5	.592	.603	.098	.116	.177
1897	Jan.	6	2	11	2–3	24.5	356.816	421.367	−0.100	+0.118	778.201
		7	2	14	2	25.5	.772	.381	.101	.119	.171
		8	2	0	3	24.5	.770	.363	.101	.119	.151
1897	May	31	20	12	–	47.5	356.829	421.349	−0.120	+0.142	778.200
	July	22	21	56	3–4	67	.835	.365	.127	.150	.223
		25	22	9	1–2	66	.810	.355	.128	.151	.188
								Assumed Annual Proper Motion and Mean Sum:	−0.050	+0.059	778.189

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	65.088	−0.003	64.810	$+1.0\,x$	$-1.94\,y$	$-2.52\,z$	$= +0.005$	−0.005
C.	.136	+ .000	.865	1.0	1.81	2.49	+ .060	+ .051
C.	.061	− .002	.791	1.0	1.63	2.46	− .014	− .022
C.	64.994	−0.002	64.778	$+1.0\,x$	$+1.64\,y$	$-1.97\,z$	$= -0.027$	−0.021
C.	65.004	+ .004	.794	1.0	1.60	1.97	− .011	− .005
C.	.011	+ .001	.798	1.0	1.58	1.96	− .007	− .001
C.	64.551	−0.001	64.768	$+1.0\,x$	$+1.72\,y$	$+2.01\,z$	$= -0.037$	−0.028
C.	.609	+ .002	.831	1.0	1.70	2.02	+ .026	+ .035
C.	.593	+ .003	.816	1.0	1.69	2.02	+ .011	+ .020
C.	64.520	−0.001	64.781	$+1.0\,x$	$-1.98\,y$	$+2.41\,z$	$= -0.024$	−0.031
C.	.530	− .003	.804	1.0	1.53	2.55	− .001	− .006
C.	.545	+ .000	.824	1.0	1.47	2.56	+ .019	+ .015

Assumed Mean Difference: 64.805

Normals:

			R
$+12.00\,x$	$-0.43\,y$	$+0.20\,z$	$= +0.000$
-0.43	$+34.58$	$+1.82$	$= -0.148$
$+0.20$	$+1.82$	$+61.26$	$= -0.050$

Solution:

	R	R	
$x =$	-0.0002	± 0.0055	Wt. 11.99
$y =$	-0.0042	± 0.0032	34.52
$z =$	-0.0007	± 0.0024	61.16

$[nn] = 0.00782$ $[vv] = 0.00713$ Prob. Error 1 Eq. $= \pm 0''.241$

$\pi = -0''.053 \pm 0''.041$

Piazzi 23^h, 43	B. D. $+4°$, 4994	Mag. 8.5	R. A. 23^h 11.5^m	Decl. $+4°$ 37′	Pos. Angle.
a	$+4°$, 4985	7.0	23 6.6	4 12	$251°.3$
b	$+5°$, 5165	7.8	23 17.0	5 23	$60°.5$

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July	7	21	59	2–3	57	361.756	447.169	+0.060	−0.085	808.900
		10	21	18	2–3	65	.718	.155	.060	.084	.849
		12	20	56	2–3	68.5	.713	.151	.059	.084	.839
1893	Jan.	16	1	35	3	8.5	361.725	447.124	+0.047	−0.067	808.829
		17	1	28	2–3	10.5	.744	.156	.047	.067	.880
		19	1	39	2–3	20	.759	.133	.047	.066	.873
1895	Dec.	4	1	39	2–3	21.5	361.777	447.000	−0.022	+0.032	808.787
		16	1	2	2–3	29	.802	.021	.023	.033	.833
		31	1	42	2–3	32	.784	.011	.024	.034	.805
1898	Sept.	20	21	11	3	51.5	361.856	446.948	−0.089	+0.126	808.841
		21	21	4	2–3	49.5	.963	447.000	.089	.126	809.000
		27	21	28	2–3	55.5	.897	446.962	.090	.127	808.896
							Assumed Annual Proper Motion and Mean Sum:		+0.024	−0.034	808.861

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	85.413	−0.004	85.264	$+1.0x$	$-1.82y$	$-2.49z$ =	−0.016	−0.018
E.	.437	+ .001	.294	1.0	1.77	2.48	+ .014	+ .011
E.	.438	+ .002	.297	1.0	1.74	2.47	+ .017	+ .013
E.	85.399	+0.003	85.288	$+1.0x$	$+1.57y$	$-1.96z$ =	+0.008	+0.004
E.	.412	− .002	.296	1.0	1.55	1.96	+ .016	+ .012
E.	.374	− .001	.260	1.0	1.52	1.95	− .020	− .024
E.	85.223	+0.008	85.285	$+1.0x$	$+1.93y$	$+0.93z$ =	+0.005	+0.004
E.	.219	+ .003	.278	1.0	1.93	0.96	− .002	− .003
E.	.227	+ .006	.291	1.0	1.82	1.00	+ .011	+ .010
E.	85.092	+0.002	85.309	$+1.0x$	$+0.24y$	$+3.72z$ =	+0.029	+0.033
E.	.037	− .015	.237	1.0	0.27	3.72	− .043	− .039
E.	.065	− .004	.278	1.0	0.47	3.74	− .002	+ .002
			Assumed Mean Difference:	85.280				

Normals:

			R	
$+12.00x$	$+5.97y$	$+0.76z$	$= +0.017$	
$+5.97$	$+27.74$	$+13.25$	$= +0.000$	
$+0.76$	$+13.25$	$+74.38$	$= -0.090$	

Solution:

	R	R	
$x =$	+0.0013	± 0.0044	Wt. 10.6
$y =$	+0.0004	± 0.0030	22.6
$z =$	−0.0013	± 0.0017	67.6

$[nn] = 0.00431$ $[vv] = 0.00413$ Prob. Error 1 Eq. = ± $0''.183$

$\pi = + 0''.005 \pm 0''.038$

Lal. 45755	B. D. +43°, 4445	Mag. 7.3	R. A. $23^h\ 14.6^m$	Decl. +43° 16′	Pos. Angle.
a	+42°, 4607	7.9	23 7.6	42 41	244°.6
b	+43°, 4465	7.0	23 20.8	43 59	58°.0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July 7	18 53	2	56.5	404.683	370.382	+0.027	−0.023	775.069
	10	19 4	3–4	60	.691	.393	.026	.023	.087
	12	18 51	3–4	71.5	.708	.392	.026	.022	.104
1894	Dec. 5	2 34	1–2	27.5	404.705	370.366	+0.004	−0.003	775.072
	19	3 29	1–2	28.5	.741	.375	.002	.002	.116
	21	3 29	3	29.5	.722	.370	.002	.001	.093
1895	Dec. 22	3 49	2	38.5	404.789	370.338	−0.053	+0.046	775.120
	27	3 30	2–3	29.5	.756	.303	.054	.047	.052
1896	Jan. 1	3 23	2	24.5	.744	.315	.055	.047	.051
1896	May 23	19 42	2–3	50	404.804	370.301	−0.076	+0.065	775.094
	27	18 45	2	56.5	.804	.288	.077	.066	.081
	June 15	19 52	2–3	51.5	.834	.321	.080	.068	.143
					Assumed Annual Proper Motion and Mean Sum:		+0.055	−0.047	775.090

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	34.301	+0.001	34.352	$+1.0\,x$	$+1.99\,y$	$-0.49\,z$	$=-0.003$	−0.006
C.	.298	+ .000	.347	1.0	1.98	0.48	− .008	− .011
C.	.316	− .001	.363	1.0	1.97	0.47	+ .008	+ .006
C.	34.339	+0.001	34.347	$+1.0\,x$	$-1.77\,y$	$-0.07\,z$	$=-0.008$	−0.003
C.	.366	− .001	.369	1.0	1.91	0.04	+ .014	+ .019
C.	.352	− .000	.355	1.0	1.92	0.03	+ .000	+ .005
C.	34.451	−0.001	34.351	$+1.0\,x$	$-1.92\,y$	$+0.97\,z$	$=-0.004$	−0.001
C.	.453	+ .002	.354	1.0	1.93	0.99	− .001	+ .002
C.	.429	+ .002	.329	1.0	1.94	1.00	− .026	− .023
C.	34.503	−0.000	34.362	$+1.0\,x$	$+1.66\,y$	$+1.39\,z$	$=+0.007$	+0.000
C.	.516	+ .000	.373	1.0	1.72	1.40	+ .018	+ .011
C.	.513	− .002	.363	1.0	1.95	1.45	+ .008	+ .001
	Assumed Mean Difference:		34.355					

Normals:

			R
$+12.00\,x$	$-0.12\,y$	$+5.62\,z$	$=+0.005$
-0.12	$+42.92\,y$	$-0.76\,z$	$=+0.100$
$+5.62$	$-0.76\,y$	$+9.60\,z$	$=+0.017$

Solution:

	R	R	
$x =$	−0.0007	± 0.0027	Wt. 8.70
$y =$	+0.0024	± 0.0012	42.85
$z =$	+0.0024	± 0.0030	6.95

$[nn] = 0.00152$ $[vv] = 0.00126$ Prob. Error 1 Eq. $= \pm 0''.102$

$\pi = +0''.031 \pm 0''.016$

λ Andromedae	B. D. +45°, 4283	Mag. 3.5	R. A. $23^h\ 30.5^m$	Decl. +45° 41′	Pos. Angle.
a	+45°, 4246	8.0	23 23.8	45 21	255°.1
b	+46°, 4154	8.3	23 37.9	46 7	70°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1904	July	18	19	28	3–4	78	346.017	389.780	0.000	+0.004	735.801
		19	19	2	3–4	70	.026	.770	.000	.004	.800
		28	18	53	3	63	345.992	.776	.000	.004	.772
1904	Nov.	28	4	41	2	16	346.018	389.777	0.000	+0.001	735.796
	Dec.	4	5	17	3	20	345.998	.775	.000	+ .001	.774
1905	Jan.	15	5	20	3	18	.991	.742	.000	— .000	.733
		20	4	57	2–3	29	.991	.743	.000	— .000	.734
		28	4	31	3–4	19	.993	.750	.000	— .001	.742
		30	5	7	3–4	14	.978	.740	.000	— .001	.717
1905	June	24	18	50	3–4	61	346.014	389.794	0.000	—0.004	735.804
		25	19	20	3–4	59	.022	.786	.000	.004	.804
	July	15	19	51	1–2	66	345.996	.773	.000	.005	.765
							Assumed Annual Proper Motion and Mean Sum:		0.000	+0.009	735.770

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	43.763	—0.002	43.765	$+1.0\,x$	$-1.85\,y$	$-0.45\,z$	$= +0.005$	—0.001
S.	.744	— .002	.746	1.0	1.83	0.45	— .014	— .020
S.	.784	— .000	.788	1.0	1.69	0.43	+ .028	+ .022
S.	43.759	—0.001	43.759	$+1.0\,x$	$+1.71\,y$	$-0.09\,z$	$= -0.001$	—0.002
S.	.777	— .000	.778	1.0	1.78	0.07	+ .018	+ .017
S.	.751	+ .002	.753	1.0	1.79	+0.04	— .007	— .008
S.	.752	+ .002	.754	1.0	1.72	0.05	— .006	— .007
S.	.757	+ .002	.758	1.0	1.61	0.08	— .002	— .003
S.	.762	+ .003	.764	1.0	1.58	0.08	+ .004	+ .003
S.	43.780	—0.002	43.774	$+1.0\,x$	$-1.97\,y$	$+0.48\,z$	$= +0.014$	+0.007
S.	.764	— .002	.758	1.0	1.97	0.48	— .002	— .009
S.	.777	+ .000	.772	1.0	1.87	0.54	+ .012	+ .005
	Assumed Mean Difference:		43.760					

Normals:

			R
$+12.00\,x$	$-0.99\,y$	$+0.26\,z$	$= +0.049$
-0.99	$+38.23$	-0.38	$= -0.065$
$+0.26$	-0.38	$+1.36$	$= +0.003$

Solution:

	R	R	
$x =$	$+0.0039$	± 0.0024	Wt. 11.9
$y =$	-0.0016	± 0.0013	38.0
$z =$	$+0.0007$	± 0.0060	1.4

$[nn] = 0.00177$ $[vv] = 0.00140$ Prob. Error 1 Eq. $= \pm 0''.107$

$\pi = -0''.020 \pm 0''.017$

ι Piscium	B. D. +4°, 5035	Mag. 4.2	R. A. $23^h\ 27.0^m$	Decl. +4° 51′	Pos. Angle.
a	+4°, 5029	8.0	23 32.5	4 40	263°.0
b	+5°, 5219	8.7	23 38.1	5 40	58°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892	July	7	22	23	2–3	57	390.467	462.248	+0.030	—0.030	852.715
		10	21	42	2–3	64.5	.417	.223	.030	.030	.640
		12	21	12	2–3	68.5	.413	.211	.030	.030	.624
1893	Jan.	16	1	57	3	7.5	390.377	462.211	+0.024	—0.024	852.588
		17	1	43	2–3	10	.438	.225	.024	.024	.663
		19	1	54	2–3	19.5	.416	.200	.023	.023	.616
1895	Dec.	4	2	9	2–3	22	390.446	462.149	—0.011	+0.011	852.595
		17	2	12	2–3	28	.426	.231	.012	.012	.657
1896	Jan.	3	2	3	3	28	.444	.152	.012	.012	.596
1898	Sept.	13	21	23	2	55.5	390.515	462.133	—0.044	+0.044	852.648
		20	21	29	3	50	.513	.151	.045	.045	.664
	Oct.	9	21	35	3	52.5	.513	.160	.045	.045	.673
							Assumed Annual Proper Motion and Mean Sum :		+0.012	—0.012	852.640

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	71.781	—0.006	71.715	$+1.0\,x$	$-1.82\,y$	$-2.49\,z$	$= -0.025$	—0.014
E.	.806	+ .000	.746	1.0	1.79	2.48	+ .006	+ .016
E.	.798	+ .001	.739	1.0	1.76	2.47	— .001	+ .009
E.	71.834	+0.004	71.790	$+1.0\,x$	$+1.62\,y$	$-1.96\,z$	$= +0.050$	+0.025
E.	.787	— .002	.737	1.0	1.60	1.96	— .003	— .027
E.	.784	+ .002	.740	1.0	1.55	1.95	+ .000	— .024
E.	71.703	+0.004	71.729	$+1.0\,x$	$+1.87\,y$	$+0.93\,z$	$= -0.011$	—0.026
E.	.805	— .001	.828	1.0	1.90	0.96	+ .088	+ .072
E.	.708	+ .004	.736	1.0	1.80	1.01	— .004	— .018
E.	71.618	—0.001	71.705	$+1.0\,x$	$-0.13\,y$	$+3.70\,z$	$= -0.035$	—0.017
E.	.638	— .002	.726	1.0	+0.08	3.72	— .014	+ .002
E.	.647	— .003	.734	1.0	+0.70	3.77	— .006	+ .003
	Assumed Mean Difference :		71.740					

Normals :

			R		R	R	
$+12.00\,x$	$+5.62\,y$	$+0.78\,z$	$= +0.045$	*Solution :* $x =$	-0.0011	± 0.0065	Wt. 10.8
$+5.62$	$+28.06$	$+11.84$	$= +0.251$	$y =$	$+0.0109$	± 0.0044	23.7
$+0.78$	$+11.84$	$+74.47$	$= -0.180$	$z =$	-0.0041	± 0.0026	69.2

$[nn] = 0.01252$ $\quad [vv] = 0.00910$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.271$

$\pi = +0''.138 \pm 0''.055$

Piazzi 23^h, 164	B. D. +57°, 2787	Mag. 7.5	R. A. $23^h\ 36.4^m$	Decl. +57° 15′	Pos. Angle.
a	+57°, 2758	8.0	23 26.0	57 6	243°.6
b	+57°, 2829	7.2	23 48.0	57 17	89°.3

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July	7	18	9	2	57.5	400.413	445.788	+0.008	−0.011	846.198
		12	19	29	2	71	.422	.810	.008	.010	.230
		16	19	15	2–3	68	.424	.811	.008	.010	.233
1894	Dec.	5	3	12	1–2	27	400.461	445.778	+0.001	−0.002	846.238
		19	4	4	1–2	28.5	.462	.778	.001	.001	.240
		21	4	0	3	29.5	.425	.769	.001	.001	.194
1895	Dec.	15	3	13	3–4	32	400.429	445.746	−0.016	+0.021	846.180
		22	4	22	2	38	.487	.780	.016	.021	.272
1896	Jan.	1	3	53	2	24.5	.458	.748	.017	.022	.211
1896	May	15	19	5	2–3	57	400.466	445.771	−0.023	+0.030	846.244
		22	19	27	3	62	.460	.783	.024	.030	.249
		23	19	6	2–3	50.5	.471	.760	.024	.031	.238
	June	11	19	45	2–3	51.5	.446	.709	.025	.032	.162
									Assumed Annual Proper Motion and Mean Sum:	+0.017	−0.022	846.222

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	45.375	+0.001	45.357	$+1.0\,x$	$-1.77\,y$	$-0.49\,z$	$= +0.013$	−0.003
C.	.388	− .000	.370	1.0	1.71	0.47	+ .026	+ .010
C.	.387	− .001	.368	1.0	1.66	0.46	+ .024	+ .009
C.	45.317	−0.001	45.313	$+1.0x$	$+1.76\,y$	$-0.07\,z$	$= -0.031$	−0.020
C.	.316	− .001	.313	1.0	1.82	0.04	− .031	− .019
C.	.344	+ .001	.343	1.0	1.81	0.03	− .001	+ .011
C.	45.317	+0.002	45.356	$+1.0\,x$	$+1.81\,y$	$+0.95\,z$	$= +0.012$	+0.027
C.	.293	− .003	.327	1.0	1.81	0.97	− .017	− .002
C.	.290	+ .001	.330	1.0	1.76	1.00	− .014	+ .001
C.	45.305	−0.001	45.357	$+1.0\,x$	$-1.59\,y$	$+1.37\,z$	$= +0.013$	+0.005
C.	.323	− .001	.376	1.0	1.69	1.39	+ .032	+ .023
C.	.289	− .001	.343	1.0	1.71	1.39	− .001	− .010
C.	.263	+ .003	.323	1.0	1.85	1.44	− .021	− .031

Assumed Mean Difference: 45.344

Normals:

			R	
$+13.00\,x$	$-1.21\,y$	$+6.95\,z$	$= +0.004$	Wt. 8.73
-1.21	$+39.89$	-2.14	$= -0.288$	39.49
$+6.95$	-2.14	$+11.33$	$= -0.014$	7.55

Solution:

	R	R
$x =$	$+0.0016$	± 0.0042
$y =$	-0.0074	± 0.0020
$z =$	-0.0036	± 0.0045

$[nn] = 0.00561$ $[vv] = 0.00342$ Prob. Error 1 Eq. $= \pm 0''.158$

$\pi = -0''.094 \pm 0''.025$

Lal. 46650	B. D. +1°, 4774	Mag. 8.7	R. A. $23^h\ 41.6^m$	Decl. +1° 37′	Pos. Angle.
a	+1°, 4766	8.5	23 37.7	1 17	251°.4
b	+1°, 4799	8.2	23 47.0	1 40	88°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1892 July	7	22 46	2–3	57.5	300.979	378.299	+0.120	−0.204	679.194
	10	21 58	2–3	64.5	.954	.291	.119	.203	.161
	12	21 29	2–3	68.5	.942	.267	.119	.203	.125
1893 Jan.	16	2 29	3	6.5	300.913	378.322	+0.094	−0.161	679.168
	17	2 0	2–3	10	.963	.263	.094	.161	.159
1895 Dec.	17	1 47	2–3	28.5	301.110	378.033	−0.046	+0.079	679.176
	31	2 9	2–3	32	.079	.039	.048	.082	.152
1896 Jan.	3	2 36	3	26	.126	377.992	.048	.083	.153
1898 Sept.	13	21 40	2–3	54.5	301.219	377.804	−0.178	+0.303	679.148
	21	21 29	2–3	49.5	.224	.814	.179	.305	.164
Oct.	9	21 52	3	53	.259	.800	.181	.309	.187
						Assumed Annual Proper Motion and Mean Sum :	+0.048	−0.082	679.163

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	77.320	−0.004	76.992	$+1.0\,x$	$-1.83\,y$	$-2.49\,z$ =	−0.058	−0.021
E.	.337	+ .000	77.015	1.0	1.79	2.48	− .035	+ .002
E.	.325	+ .004	.007	1.0	1.77	2.47	− .043	− .007
E.	77.409	−0.001	77.153	$+1.0\,x$	$+1.61\,y$	$-1.96\,z$ =	+0.103	+0.085
E.	.300	+ .000	.045	1.0	1.59	1.96	− .005	− .022
E.	76.923	−0.001	77.047	$+1.0\,x$	$+1.89\,y$	$+0.96\,z$ =	−0.003	−0.023
E.	.960	+ .001	.091	1.0	1.81	1.00	+ .041	+ .021
E.	.866	+ .001	76.998	1.0	1.78	1.01	− .052	− .072
E.	76.585	+0.002	77.068	$+1.0\,x$	$-0.16\,y$	$+3.70\,z$ =	+0.018	+0.028
E.	.590	− .000	.074	1.0	+0.09	3.72	+ .024	+ .030
E.	.541	− .003	.028	1.0	+0.68	3.77	− .022	− .025
			Assumed Mean Difference :	77.050				

R

Normals : $+11.00\,x + 3.90\,y + 2.80\,z = -0.032$

$+3.90 + 25.32 + 14.81 = +0.363$

$+2.80 + 14.81 + 70.81 = +0.206$

Solution :	R	R	
x =	−0.0085	± 0.0095	Wt. 10.4
y =	+0.0158	± 0.0066	21.2
z =	+0.0001	± 0.0039	62.1

$[nn] = 0.02282$ $[vv] = 0.01667$ Prob. Error 1 Eq. = ± 0.″389

$\pi = +0.''200 \pm 0.''084$

85 Pegasi	B. D. +26°, 4734	Mag. 6.1	R. A. 23^h 54.6^m	Decl. +26° 19′	Pos. Angle.
a	+25°, 5050	8.3	23 51.5	25 50	235.°4
b	+26°, 4744	6.8	23 57.6	26 52	49.°2

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1894	July 16	19 55	2–3	68	242.196	245.246	—0.002	0.000	487.440
	Aug. 23	21 10	1–2	67.5	.164	.237	.002	.000	.399
1894	Dec. 25	4 10	3	23	242.143	245.214	—0.000	0.000	487.357
	31	4 6	2	17.5	.180	.232	.000	.000	.412
1895	Jan. 13	5 13	2–3	26.5	.120	.259	+ .000	.000	.379
1895	Dec. 15	3 53	3–4	31.5	242.134	245.250	+0.005	0.000	487.389
	27	3 0	2–3	30	.159	.259	.005	.000	.423
1896	Jan. 3	3 18	2–3	25.5	.167	.234	.005	.000	.406
1896	May 27	19 54	2	54	242.118	245.233	+0.007	0.000	487.358
	June 2	20 23	2	49.5	.165	.230	.007	.000	.402
	11	20 50	2–3	51	.202	.228	.007	.000	.437
	Assumed Annual Proper Motion and Mean Sum:						—0.005	0.000	487.399

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	3.050	—0.000	3.052	$+1.0\,x$	$-1.95\,y$	$-0.46\,z$	$= -0.023$	—0.008
C.	.073	+ .000	.075	1.0	1.38	0.36	+ .000	+ .011
C.	3.071	+0.000	3.071	$+1.0\,x$	$+1.88\,y$	$-0.02\,z$	$= -0.004$	—0.018
C.	.052	— .000	.052	1.0	1.90	0.00	— .023	— .037
C.	.139	+ .000	.139	1.0	1.88	+0.03	+ .064	+ .050
C.	3.116	+0.000	3.111	$+1.0\,x$	$+1.78\,y$	$+0.95\,z$	$= +0.036$	+0.023
C.	.100	— .000	.095	1.0	1.89	0.99	+ .020	+ .006
C.	.067	— .000	.062	1.0	1.91	1.01	— .013	— .027
C.	3.115	+0.000	3.108	$+1.0\,x$	$-1.54\,y$	$+1.40\,z$	$= +0.033$	+0.045
C.	.065	— .000	.058	1.0	1.65	1.42	— .017	— .004
C.	.026	— .000	.019	1.0	1.79	1.44	— .056	— .042
	Assumed Mean Difference:		3.075					

Normals:

$$\begin{array}{rrrrr} & & & & R'' \\ +11.00\,x & +2.93\,y & +6.40\,z & = & +0.017 \\ +2.93\,x & +35.05\,y & -0.19\,z & = & +0.267 \\ +6.40\,x & -0.19\,y & +9.30\,z & = & -0.005 \end{array}$$

Solution:

$$\begin{array}{lrr} & R & R \\ x = & -0.0004 & \pm 0.0092 \quad \text{Wt. } 6.33 \\ y = & +0.0076 & \pm 0.0040 \quad 33.63 \\ z = & -0.0001 & \pm 0.0099 \quad 5.47 \end{array}$$

$[nn] = 0.01155$ $[vv] = 0.00949$ Prob. Error 1 Eq. $= \pm 0.''294$

$\pi = +0.''096 \pm 0.''051$

Piazzi 23^h, 267	B. D. +33°, 4828	Mag. 6.3	R. A. 23^h 57.3^m	Decl. +33° 52′	Pos. Angle.
a	+33°, 4813	8.3	23 52.7	33 23	244°.3
b	+34°, 3	7.2	0 1.0	34 7	69°.8

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1893	July	9	19 58	3	61	304.565	228.055	+0.099	−0.080	532.639
		10	19 17	2	60	.570	.066	.099	.080	.655
		14	19 51	2–3	60	.562	.053	.098	.079	.634
1895	Jan.	20	4 48	2	19.5	304.679	227.948	−0.003	+0.003	532.627
		29	5 11	2	14.5	.661	.960	.005	.004	.620
		31	5 11	1–2	18.5	.651	.961	.005	.004	.611
1896	Jan.	3	3 47	2–3	25	304.697	227.901	−0.068	+0.055	532.585
	Feb.	13	4 20	2	24	.736	.904	.075	.060	.625
1896	June	10	20 2	2–3	50.5	304.784	227.890	−0.096	+0.078	532.656
		15	20 30	2–3	51	.775	.898	.097	.078	.654
		18	20 12	2	62.5	.766	.907	.098	.079	.654
1897	Jan.	19	2 31	3	8.5	304.798	227.867	−0.137	+0.111	532.639
							Assumed Annual Proper Motion and Mean Sum:	+0.067	−0.054	532.630

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	76.510	−0.001	76.688	$+1.0\,x$	$+2.01\,y$	$-1.48\,z$	$= -0.005$	−0.001
C.	.504	− .003	.680	1.0	2.01	1.48	− .013	− .009
C.	.509	− .001	.685	1.0	2.00	1.47	− .008	− .004
C.	76.731	+0.000	76.725	$+1.0\,x$	$-1.85\,y$	$+0.05\,z$	$= +0.032$	+0.033
C.	.701	+ .001	.693	1.0	1.74	0.08	+ .000	+ .001
C.	.690	+ .003	.684	1.0	1.71	0.08	− .009	− .008
C.	76.796	+0.006	76.679	$+1.0\,x$	$-1.98\,y$	$+1.01\,z$	$= -0.014$	−0.015
C.	.832	+ .001	.698	1.0	1.43	1.12	+ .005	+ .004
C.	76.894	−0.004	76.716	$+1.0\,x$	$+1.86\,y$	$+1.44\,z$	$= +0.023$	+0.022
C.	.877	− .003	.699	1.0	1.93	1.45	+ .006	+ .005
C.	.859	− .003	.679	1.0	1.96	1.46	− .014	− .015
C.	76.931	−0.001	76.682	$+1.0\,x$	$-1.86\,y$	$+2.05\,z$	$= -0.011$	−0.014
	Assumed Mean Difference:		76.693					

Normals:

			R
$+12.00\,x$	$+1.20\,y$	$+4.31\,z$	$= -0.008$
$+1.20$	$+41.89$	-8.32	$= -0.027$
$+4.31$	-8.32	$+19.33$	$= +0.030$

Solution:

	R	R	
$x =$	−0.0013	± 0.0033	Wt. 10.80
$y =$	−0.0003	± 0.0018	37.46
$z =$	+0.0018	± 0.0028	15.94

$[nn] = 0.00246$ $\quad [vv] = 0.00240$ $\quad$ Prob. Error 1 Eq. $= \pm 0''.140$

$\pi = -0''.004 \pm 0''.023$

§ 4. Observations of Red Stars for Color Effect.

The work of the preceding pages, in which every precaution to eliminate known sources of error was employed, appears to us to be free from all systematic error, except perhaps one due to the star's color. Any perceptible difference in the mean refrangibility of the light of two stars might possibly produce an effect upon the measured distance between them which would be a function of the hour angle, and hence affect their apparent relative parallax, since it is generally impossible for practical reasons with our instrument to make observations at the two different parallax epochs otherwise than on opposite sides of the meridian. To ascertain whether an error due to this cause is appreciable in actual observation Dr. Chase, in 1898 and 1899, made a series of observations on five highly colored stars selected from Krüger's *Catalog der Farbigen Sterne*, carrying out the investigation in the following manner: —

The plan was at the epoch when the star culminates about midnight to measure the distances between the red star and each of two nearly equally distant comparison stars, one preceding and the other following, and as nearly as possible on the same parallel of declination, at rather large hour angles both east and west of the meridian. By taking two comparison stars we were able, as in the parallax work, to correct for any change in the scale value, and to eliminate any errors varying with the time.

The refraction of two stars with light of a different mean refrangibility being represented by

$$\beta \tan z, \quad \text{and } (\beta + \Delta\beta) \tan z$$

the measured distance between two such stars should receive, besides the correction for differential refraction, the additional correction

$$\Delta\beta \tan z \cos (p - q)$$

where z denotes the zenith distance, p the position angle of the red star from the comparison star, q the parallactic angle, and $\Delta\beta$ the supposed color effect.

The following pages give the measures corrected for refraction and aberration, the value of $\tan z \cos (p-q)$ for each observed distance, and the sums, differences, corrections for temporary scale value, and corrected differences, as in the series for parallax determination. These last, by their variation from an assumed mean difference, furnish the equations of condition which follow, in which x and x' represent the required corrections to the assumed mean difference for each epoch, $\Delta\beta$ the quantity to be determined, whose coefficient is the difference of the values of $\tan z \cos (p-q)$ for the two distances, and the second member the observed difference for each night minus the assumed mean difference. The star Krüger 1181 was specially selected because it had a close neighboring star presumably of average color, and as a test of the value of the method this latter also was observed with respect to the same comparison stars in conjunction with the red star and symmetrically with it, so that the conditions should be absolutely the same. For both stars, likewise, the treatment and solution were carried out in precisely the same manner.

Krüger 985	Color 6.0	B. D. +23°, 2467	Mag. 7.4	R. A. 12h 24.4m	Decl. +23°46′	Pos. Angle.
a		+24°, 2458	7.5	12 18.4	24 10	285°.3
b		+23°, 2479	7.0	12 31.7	23 26	100°.6

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	tan *z* cos (*p*–*q*)	Distance *b*. R	tan *z* cos (*p*–*q*)	Sum. R
1898	Apr.	3	16	38	2–3	19	412.647	+0.92	484.054	−0.97	896.701
		7	8	48	2–3	38.5	.648	−1.06	.033	+1.07	.681
		7	17	5	3	34	.654	+1.12	.001	−1.16	.655
		8	8	48	3–4	48	.633	−1.06	.036	+1.07	.669
		8	16	10	1–2	37.5	.632	+0.79	.006	−0.78	.638
		13	9	2	3	48.5	.652	−0.97	.057	+0.97	.709
		16	9	15	3	49	.638	−0.87	.049	+0.90	.687
	May	9	17	24	—	38.5	.637	+1.26	.047	−1.30	.684
1899	Apr.	4	9	15	2	34	412.653	−0.88	484.056	+0.90	896.709
		4	16	28	3	29	.638	+0.84	.047	−0.86	.685
		5	9	2	3	34	.642	−0.96	.024	+0.97	.666
		5	16	45	3	28	.639	+1.00	.035	−1.02	.674
		6	9	8	—	36	.639	−0.92	.050	+0.93	.689
		11	9	19	3	38	.621	−0.85	.023	+0.86	.644
		12	17	8	2–3	40	.644	+1.08	.031	−1.17	.675
		27	17	4	1–2	38.5	.640	+1.04	.058	−1.13	.698

Mean: 896.679

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	71.407	−0.002	71.405	+1.0 *x*	+1.89 Δ *β*	=	+0.008	+0.015
C.	.385	− .000	.385	1.0	−2.13		− .012	− .011
C.	.347	+ .002	.349	1.0	+2.28		− .048	− .040
C.	.403	+ .001	.404	1.0	−2.13		+ .007	+ .008
C.	.374	+ .003	.377	1.0	+1.57		− .020	− .014
C.	.405	− .002	.403	1.0	−1.94		+ .006	+ .007
C.	.411	− .001	.410	1.0	−1.77		+ .013	+ .014
C.	.410	− .000	.410	1.0	+2.56		+ .013	+ .021
C.	71.403	−0.002	71.401	+1.0 *x′*	−1.78 Δ *β*	=	+0.004	−0.003
C.	.409	− .000	.409	1.0	+1.70		+ .012	+ .010
C.	.382	+ .001	.383	1.0	−1.93		− .014	− .021
C.	.396	+ .000	.396	1.0	+2.02		− .001	− .002
C.	.411	− .001	.410	1.0	−1.85		+ .013	+ .006
C.	.402	+ .003	.405	1.0	−1.71		+ .008	+ .001
C.	.387	+ .000	.387	1.0	+2.25		− .010	− .011
C.	.418	− .002	.416	1.0	+2.17		+ .019	+ .018

Mean: 71.397

Normals:

			R	Solution:	R	R	
+8.00 *x*	+0.00 *x′*	+ 0.33 Δ *β*	= −0.033	*x* =	−0.0041	± 0.0042	Wt. 8.00
+0.00	+8.00	+ 0.87	= +0.031	*x′* =	+0.0040	± 0.0042	7.99
+0.33	+0.87	+63.72	= −0.097	Δ *β* =	−0.0015	± 0.0015	63.62

$[nn] = 0.00439$ $[vv] = 0.00396$ Prob. Error 1 Eq. = ± 0″.149

$\Delta\beta = -0''.019 \pm 0''.019$

Krüger 1078 Color 7.1	B. D. +41°, 2434	Mag. 6.7	R. A. $13^h\ 47.0^m$	Decl. +41° 4′	Pos. Angle.
a	+41°, 2422	8.0	13 39.0	+41 8	273°.6
b	+41°, 2454	6.5	13 55.8	+41 10	87°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	tan *z* cos (*p*−*q*)	Distance *b*. R	tan *z* cos (*p*−*q*)	Sum. R
1898 Apr. 7	9 25	3	37	426.911	−1.06	469.971	+1.06	896.882
8	9 30	3–4	48	.900	−1.03	.954	+1.03	.854
13	17 36	2	44.5	.933	+0.85	.989	−0.88	.922
30	11 17	2–3	57.5	.925	−0.50	.973	+0.56	.898
May 9	17 55	2–3	38.5	.905	+0.96	.967	−0.95	.872

Mean: 896.886

Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition. R	Residuals. R
43.060	+0.000	43.060	$+1.0\,x - 2.12\,\Delta\beta = +0.004$	+0.005
.054	+ .002	.056	$1.0 \quad - 2.06$ + .000	+ .001
.056	− .002	.054	$1.0 \quad + 1.73$ − .002	− .003
.048	− .001	.047	$1.0 \quad - 1.06$ − .009	− .008
.062	+ .001	.063	$1.0 \quad + 1.91$ + .007	+ .005

Mean: 43.056

Normals: $+5.00\,x - 1.60\,\Delta\beta = -0.000$ R
$-1.60 \quad +16.49 \quad = +0.012$

Solution: $x = +0.0002 \pm 0.0021$ R R
$\Delta\beta = +0.0007 \pm 0.0011$

Wt. 4.84
15.98

$[nn] = 0.00015 \qquad [vv] = 0.00014 \qquad$ Prob. Error 1 Eq. $= \pm 0''.059$

$\Delta\beta = +0''.009 \pm 0''.015$

Krüger 1080	Color 7.0	B. D. +19°, 2728	Mag. 7.9	R. A. $13^h\ 48.4^m$	Decl. +19° 24′	Pos. Angle.
a		+19°, 2716	7.8	13 41.0	19 40	278°.7
b		+19°, 2750	8.0	13 55.6	19 50	75°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	tan *z* cos (*p* − *q*)	Distance *b*. R	tan *z* cos (*p* − *q*)	Sum. R
1898 Apr.	3	10 28	2–3	25	496.775	−0.93	506.307	+0.68	1006.082
	3	17 32	2–3	19	.799	+0.87	.292	−1.14	.091
	8	17 26	1–2	36	.771	+0.85	.309	−1.07	.080
	13	9 39	3	47	.791	−1.34	.330	+0.99	.121
	13	16 50	2	44.5	.791	+0.67	.299	−0.86	.090
	16	9 46	3	48	.806	−1.27	.288	+0.93	.094
	30	12 3	2–3	57	.779	−0.43	.310	+0.24	.089
May	13	18 0	3	50	.792	+1.09	.300	−1.44	.092
1899 Apr.	4	9 48	2	34	496.783	−1.28	506.278	+0.94	1006.061
	4	16 52	3	29	.779	+0.68	.285	−0.86	.064
	5	9 43	3	34	.789	−1.31	.255	+0.97	.044
	5	17 21	3	28	.783	+0.83	.286	−1.05	.069
	6	9 42	—	36	.788	−1.32	.305	+0.97	.093
	10	9 40	3	37	.797	−1.32	.288	+0.99	.085
	12	17 43	2–3	40.5	.782	+0.96	.281	−1.24	.063
	28	17 27	2	40	.795	+0.85	.296	−1.07	.091

Mean: 1006.088

Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.		R	Residuals. R
9.532	+0.000	9.532	$+1.0\,x$	$-1.61\,\Delta\beta$	= +0.025	+0.016
.493	− .000	.493	1.0	+2.01	− .014	− .024
.538	+ .000	.538	1.0	+1.92	+ .031	+ .021
.539	− .000	.539	1.0	−2.33	+ .032	+ .024
.508	− .000	.508	1.0	+1.53	+ .001	− .009
.482	− .000	.482	1.0	−2.20	− .025	− .033
.531	− .000	.531	1.0	−0.67	+ .024	+ .015
.508	− .000	.508	1.0	+2.53	+ .001	− .009
9.495	+0.000	9.495	$+1.0\,x'$	$-2.22\,\Delta\beta$	= −0.012	−0.001
.506	+ .000	.506	1.0	+1.54	− .001	+ .008
.466	+ .000	.466	1.0	−2.28	− .041	− .030
.503	+ .000	.503	1.0	+1.88	− .004	+ .005
.517	− .000	.517	1.0	−2.29	+ .010	+ .021
.491	+ .000	.491	1.0	−2.31	− .016	− .005
.499	+ .000	.499	1.0	+2.20	− .008	+ .001
.501	− .000	.501	1.0	+1.92	− .006	+ .003

Mean: 9.507

Normals:

			R	
$+8.00\,x$	$+0.00\,x'$	$+1.18\,\Delta\beta$	= +0.075	
+0.00	+8.00	−1.56	= −0.078	
+1.18	−1.56	+64.91	= +0.055	

Solution:

	R	R	
x	= +0.0094	± 0.0046	Wt. 7.98
x'	= −0.0097	± 0.0046	7.96
$\Delta\beta$	= +0.0004	± 0.0016	64.44

$[nn] = 0.00631$ $[vv] = 0.00482$ Prob. Error 1 Eq. = ± 0.″165

$\Delta\beta = +0.''005 \pm 0.''020$

Krüger 1108	Color 8.7	B. D. +26°, 2563	Mag. 8.0	R. A. $14^h\ 17.6^m$	Decl. +26° 23′	Pos. Angle.
a		+26°, 2554	7.0	14 14.2	26 43	296°.0
b		+26°, 2575	7.0	14 22.3	26 29	82°.2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	tan *z* cos (φ − *q*)	Distance *b*. R	tan *z* cos (φ − *q*)	Sum. R
1898	May	9	11 56	−	43	243.517	−0.67	295.314	+0.48	538.831
		10	11 9	2	47	.528	−0.89	.335	+0.69	.863
		13	11 40	3	58	.534	−0.71	.350	+0.54	.884
		13	18 36	3	49	.517	+0.70	.350	−1.22	.867
		14	11 34	2	58	.520	−0.75	.361	+0.56	.881
		14	18 31	3	47.5	.524	+0.70	.357	−1.18	.881
		14	19 1	3	47	.532	+0.80	.376	−1.45	.908
1899	Apr.	10	10 16	3	37	243.537	−1.21	295.332	+0.96	538.869
		11	9 57	3	38	.540	−1.43	.357	+1.11	.897
		26	17 33	2	51.5	.527	+0.47	.352	−0.81	.879
		27	17 44	1–2	38	.513	+0.50	.346	−0.87	.859
		28	10 31	2–3	47.5	.524	−1.11	.352	+0.84	.876
		28	11 15	2–3	46.5	.538	−0.87	.348	+0.66	.886
		28	18 3	1–2	39	.530	+0.54	.330	−0.98	.860
		28	18 29	1–2	38	.543	+0.67	.362	−1.17	.905

Mean: 538.876

Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.		R	Residuals. R
51.797	+0.004	51.801	$+1.0\,x$	$-1.15\,\Delta\beta$ =	−0.019	−0.019
.807	+ .001	.808	1.0	−1.58	− .012	− .011
.816	− .001	.815	1.0	−1.25	− .005	− .005
.833	+ .001	.834	1.0	+1.92	+ .014	+ .003
.841	− .000	.841	1.0	−1.31	+ .021	+ .021
.833	− .000	.833	1.0	+1.88	+ .013	+ .002
.844	− .003	.841	1.0	+2.25	+ .021	+ .009
51.795	+0.001	51.796	$+1.0\,x'$	$-2.17\,\Delta\beta$ =	−0.024	−0.013
.817	− .002	.815	1.0	−2.54	− .005	+ .007
.825	− .000	.825	1.0	+1.28	+ .005	+ .004
.833	+ .002	.835	1.0	+1.37	+ .015	+ .013
.828	+ .000	.828	1.0	−1.95	+ .008	+ .018
.810	− .001	.809	1.0	−1.53	− .011	− .002
.800	+ .002	.802	1.0	+1.52	− .018	− .020
.819	− .003	.816	1.0	+1.84	− .004	− .007

Mean: 51.820

Normals: $+7.00\,x + 0.00\,x' + 0.76\,\Delta\beta = +0.033$ (R)
$+0.00 + 8.00 - 2.18 = -0.034$
$+0.76 - 2.18 + 45.90 = +0.176$

Solution: $x = +0.0043 \pm 0.0035$ (R) Wt. 6.99
$x' = -0.0033 \pm 0.0033$ 7.90
$\Delta\beta = +0.0036 \pm 0.0014$ 45.23

$[nn] = 0.00315$ $[vv] = 0.00226$ Prob. Error 1 Eq. = $\pm$ 0".117

$\Delta\beta = +$ 0".046 $\pm$ 0".017

Krüger 1181	Color 7.8	B. D. +24°, 2901	Mag. 7.4	R. A. $15^h\ 32.1^m$	Decl. +25° 0′	Pos. Angle.
a		+24°, 2884	8.0	15 27.0	24 44	256°.4
b		+24°, 2914	7.3	15 37.9	24 55	93°.2

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	tan *z* cos (*p* − *q*)	Distance *b*. R	tan *z* cos (*p* − *q*)	Sum. R
1898 May 17	12 28	3	52.5	337.091	−0.70	376.620	+0.79	713.711
17	18 48	2	47	.078	+0.83	.625	−0.73	.703
30	13 9	3	57	.103	−0.50	.603	+0.57	.706
31	13 15	3	58.5	.099	−0.48	.617	+0.54	.716
31	19 44	3–4	56	.078	+1.20	.614	−1.06	.692
June 5	13 40	3	55.5	.101	−0.38	.618	+0.44	.719
5	19 53	3	50	.088	+1.28	.632	−1.11	.720
15	20 22	2–3	47	.121	+1.57	.615	−1.34	.736
1899 Apr. 27	11 29	3	43.5	337.083	−1.01	376.594	+1.12	713.677
May 9	11 56	3	63	.108	−0.87	.620	+0.97	.728
11	12 4	3	52	.118	−0.82	.635	+0.89	.753
11	18 59	3	49	.105	+0.89	.628	−0.82	.733
12	11 58	1–2	62.5	.089	−0.84	.613	+0.92	.702
June 3	19 30	2–3	59.5	.106	+1.11	.616	−1.01	.722
4	19 37	2–3	60	.103	+1.13	.632	−1.04	.735
11	19 48	2	54	.106	+1.26	.618	−1.13	.724

Mean: 713.717

Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.		R	Residuals. R
39.529	+0.000	39.529	$+1.0\,x$	$-1.49\,\Delta\beta =$	+0.009	+0.008
.547	+ .001	.548	1.0	+1.56	+ .028	+ .024
.500	+ .001	.501	1.0	−1.07	− .019	− .020
.518	+ .000	.518	1.0	−1.02	− .002	− .004
.536	+ .001	.537	1.0	+2.26	+ .017	+ .012
.517	+ .000	.517	1.0	−0.82	− .003	− .005
.544	− .000	.544	1.0	+2.39	+ .024	+ .019
.494	− .001	.493	1.0	+2.91	− .027	− .033
39.511	+0.002	39.513	$+1.0\,x'$	$-2.13\,\Delta\beta =$	−0.007	−0.001
.512	− .001	.511	1.0	−1.84	− .009	− .003
.517	− .002	.515	1.0	−1.71	− .005	+ .000
.523	− .001	.522	1.0	+1.71	+ .002	+ .004
.524	+ .001	.525	1.0	−1.76	+ .005	+ .010
.510	− .003	.507	1.0	+2.12	− .013	− .012
.529	− .001	.528	1.0	+2.17	+ .008	+ .009
.512	− .000	.512	1.0	+2.39	− .008	− .007

Mean: 39.520

Normals:

			R
$+8.00\,x$	$+0.00\,x'$	$+4.72\,\Delta\beta$	$= +0.027$
$+0.00$	$+8.00$	$+0.95$	$= -0.027$
$+4.72$	$+0.95$	$+58.56$	$= +0.076$

Solution:

	R	R	
$x =$	$+0.0027$	± 0.0037	Wt. 7.62
$x' =$	-0.0035	± 0.0036	7.98
$\Delta\beta =$	$+0.0011$	± 0.0014	55.67

$[nn] = 0.00331$ $[vv] = 0.00306$ Prob. Error 1 Eq. $= \pm 0''.131$

$\Delta\beta = +0''.014 \pm 0''.018$

W. B. 15^h, 745	Color —	B. D. +25°, 2944	Mag. 8.9	R. A. 15^h 32.0^m	Decl. +25° 2′	Pos. Angle.
a		+24°, 2884	8.0	15 27.0	24 44	254°.5
b		+24°, 2914	7.3	15 37.9	24 55	94°.6

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	tan *z* cos ($\phi - q$)	Distance *b*. R	tan *z* cos ($\phi - q$)	Sum. R
1898 May	17	12 28	3	52.5	333.053	−0.69	383.875	+0.81	716.928
	17	18 48	2	47	.075	+0.84	.878	−0.71	.953
	30	13 9	3	57	.090	−0.49	.898	+0.59	.988
	31	13 15	3	58.5	.079	−0.47	.903	+0.56	.982
	31	19 44	3–4	56	.069	+1.21	.893	−1.03	.962
June	5	13 40	3	55.5	.090	−0.37	.889	+0.46	.979
	5	19 53	3	50	.060	+1.30	.890	−1.08	.950
	15	20 22	2–3	47	.058	+1.59	.918	−1.30	.976
1899 Apr.	27	11 29	3	43.5	333.056	−1.00	383.927	+1.14	716.983
May	9	11 56	3	63	.071	−0.87	.912	+0.99	.983
	11	12 4	3	52	.066	−0.82	.897	+0.91	.963
	11	18 59	3	49	.090	+0.90	.910	−0.80	717.000
	12	11 58	1–2	62.5	.064	−0.84	.917	+0.94	716.981
June	3	19 30	2–3	59.5	.089	+1.12	.922	−0.98	717.011
	4	19 37	2–3	60	.047	+1.14	.882	−1.01	716.929
	11	19 48	2	54	.060	+1.27	.889	−1.10	.949

Mean: 716.970

Difference R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.		R	Residuals. R
50.822	+0.003	50.825	$+1.0\,x$	$-1.50\,\Delta\beta$	$= -0.005$	+0.003
.803	+ .001	.804	1.0	+1.55	− .026	− .017
.808	− .001	.807	1.0	−1.08	− .023	− .015
.824	− .001	.823	1.0	−1.03	− .007	+ .001
.824	+ .001	.825	1.0	+2.24	− .005	+ .004
.799	− .001	.798	1.0	−0.83	− .032	− .024
.830	+ .001	.831	1.0	+2.38	+ .001	+ .010
.860	− .000	.860	1.0	+2.89	+ .030	+ .039
50.871	−0.001	50.870	$+1.0\,x'$	$-2.14\,\Delta\beta$	$= +0.040$	+0.031
.841	− .001	.840	1.0	−1.86	+ .010	+ .001
.831	+ .000	.831	1.0	−1.73	+ .001	− .008
.820	− .002	.818	1.0	+1.70	− .012	− .020
.853	− .001	.852	1.0	−1.78	+ .022	+ .013
.833	− .003	.830	1.0	+2.10	+ .000	− .008
.835	+ .003	.838	1.0	+2.15	+ .008	+ .000
.829	+ .001	.830	1.0	+2.37	+ .000	− .008

Mean: 50.830

Normals: $+8.00\,x + 0.00\,x' + 4.62\,\Delta\beta = -0.067$ (R)
$+0.00 + 8.00 + 0.81 = +0.069$
$+4.62 + 0.81 + 58.33 = -0.045$

Solution: $x = -0.0082 \pm 0.0045$ (R) Wt. 7.63
$x' = +0.0087 \pm 0.0044$ 7.99
$\Delta\beta = -0.0002 \pm 0.0017$ 55.59

$[nn] = 0.00562$ $[vv] = 0.00445$ Prob. Error 1 Eq. $= \pm 0''.158$

$\Delta\beta = -0''.003 \pm 0''.021$

If we arrange the results of the previous pages in the order of the stars' redness as given by KRÜGER we have —

KRÜGER	985	Color 6.0	$\Delta\beta = -0''.019 \pm 0''.019$	Wt. 63.6
	1080	7.0	$+0.005 \pm 0.020$	64.4
	1078	7.1	$+0.009 \pm 0.015$	16.0
	1181	7.8	$+0.014 \pm 0.018$	55.7
	1108	8.7	$+0.046 \pm 0.017$	45.2
W. B. 15^h, 745		...	-0.003 ± 0.021	55.6

An inspection of these results would seem to indicate that there is a discernible color effect conforming with theory, the mean light of the red star being apparently refracted less than that of the comparison stars, except in the case of KRÜGER 985, although the amount is very small except for very red stars. This conclusion is corroborated by a comparison of the results for KRÜGER 1181 and W. B. 15^h, 745, investigated under exactly the same conditions. The result for the latter coming out so nearly zero is a most satisfactory confirmation of the accuracy of the work. That the color effect is not greater rather tends to confirm Sir DAVID GILL's opinion that the Heliometer observers' tendency is to bring the similarly colored parts of the stars' spectra rather than the brightest parts into coincidence.

Now what influence this possible source of error, if real, may have upon our parallax results can be easily shown. Scarcely any of the measures were made at a zenith distance greater than 60° and the average was about 50°. The following table gives the value of the factor $\tan z \cos (p-q)$ for each twenty degrees of declination at 50° zenith distance, assuming p, the position angle of the red star from the comparison star to be 90°, for which value the difference of the factors for east and west observations is found to be a maximum. And taking the average double parallax factor to be 3.50 the last column gives the extreme correction that would have to be applied to the parallax, in which for $\Delta\beta$ is to be taken its value for a star of the same degree of redness.

Decl.	q.	$\tan z \cos (p-q)$.		$\frac{E-W}{3.50}\Delta\beta$.
		East.	West.	
°	°			
0	30.3	—0.59	+0.59	$-0.34\,\Delta\beta$
+20	52.3	—0.94	+0.94	—0.54
+40	65.0	—1.08	+1.08	—0.62
+60	74.4	—1.14	+1.14	—0.65
+80	77.5	—1.15	+1.15	—0.66

Thus considering that the color effect for a most highly colored star is not likely to be greater than $0.66 \times 0''.046 = 0''.03$ we feel justified in concluding that any vitiation in our parallax results, due to this cause, is presumably well within their probable error.

§ 5. Discussion of the Results.

In the foregoing investigations all the observations have been given equal weight, as seemed warranted by our past experience, regardless of the atmospheric conditions. To test the soundness of such an assumption Dr. Chase and Mr. Smith have for their stars separated out the residuals according to the recorded definition, 2–3 being assumed when no record was made, at the same time dividing the series into classes with respect to the magnitude of the stars as follows:—

Class I Where main star and comparison stars are all as bright as 8th magnitude.
" II Where one comparison star is fainter than 8th magnitude.
" III Where two or all stars are fainter than 8th magnitude.
" IV Where only a single comparison star was used.

The following tables give the mean residuals.

Chase.	Def. 1 & 1–2.	No. Obs.	Def. 2.	No. Obs.	Def. 2–3.	No. Obs.	Def. 3.	No. Obs.	Def. 3–4 & 4.	No. Obs.
	R		R		R		R		R	
Class I	0.0114	59	0.0105	122	0.0114	172	0.0122	170	0.0118	111
" II	.0154	32	.0137	110	.0144	176	.0126	139	.0146	79
" III	.0131	42	.0175	91	.0172	113	.0164	115	.0235	60
" IV	.0072	6	.0081	27	.0110	27	.0103	33	.0098	12

Smith.	Def. 1 to 2–3.	No. Obs.	Def. 3 to 4.	No. Obs.
	R		R	
Class I	0.0120	33	0.0109	55
" II	.0151	19	.0116	51
" III	.0124	44	.0120	63
" IV	.0060	15	.0068	31

These tables show the effect of poor definition to be inappreciable except for Chase in Class III, and it has not seemed to us worth while to attribute different weights in these cases and re-solve the equations in view of the casual distribution of the different conditions of definition. The residuals were also grouped according to temperature but no variation was apparent. The preceding parallax values may therefore be considered as final.

As regards the probable errors of these values the individual results of the several series for the probable error of 1 equation, depending as they do generally on but twelve observations, are liable to very considerable uncertainty, and it has therefore seemed to us preferable to use the weights resulting from the solution and the average probable error of 1 equation for various classes of possibly different degrees of accuracy.

We have therefore arranged these probable errors for each magnitude class with two comparison stars and subdivided them according to large, medium, and small sums, differences and ratios of differences to sums. The average values for Dr. CHASE previous and subsequent to 1901 are also given separately. The results are as follows: —

	Sums.			Differences.			Ratio, Difference : Sum.			Number of Series.
	$>750^R$	$750^R - 550^R$	$<550^R$	$>50^R$	$50^R - 25^R$	$<25^R$	$>\frac{1}{10}$	$\frac{1}{10} - \frac{1}{30}$	$<\frac{1}{30}$	
Class I	±0.″143	±0.″137	±0.″140	±0.″148	±0.″136	±0.″142	±0.″127	±0.″144	±0.″141	56
" II	.190	.162	.172	.192	.170	.172	.172	.172	.187	54
" III	.185	.210	.223	.203	.213	.201	.210	.209	.183	47
Average	±0.″166	±0.″176	±0.″177	±0.″185	±0.″165	±0.″168	±0.″176	±0.″172	±0.″166	
" C. (1)	±0.171	±0.191	±0.193	±0.195	±0.185	±0.179	±0.186	±0.194	±0.172	83
" C. (2)	.150	.135	.134	.133	.136	.149	.119	.137	.157	45

There appears to be no significant dependence upon the sums, differences or ratios, but there is a marked difference in the accuracy of CHASE's work, beginning with the taking up of the DEBALL stars in 1901, due in part to greater precaution in the consistent use of screens, adoption of a smaller arc in "swinging through," a curtailment of the observing program, and very probably to the fact that the observations do not extend over so long periods, where undoubtedly any change in the eye of the observer and in the instrument enter in to a greater degree.

Disregarding, therefore, the effect of size and symmetry of the distances we have, for each observer, the following table: —

	CHASE. (1)	No. of Stars.	CHASE. (2)	No. of Stars.	SMITH.	No. of Stars.	ELKIN.	No. of Stars.
Class I	±0.″146	31	±0.″131	17	±0.″146	8	—″—	–
" II	±0.193	26	±0.141	18	±0.150	7	±0.247	5
" III	±0.228	26	±0.159	10	±0.131	8	±0.246	6
" IV	±0.145	7	±0.055	2	±0.079	4	±0.106	1

The probable errors thus deduced could be regarded as complete only in case the work could be considered free from systematic error. A second solution of the series with four epochs, giving two values of the parallax, showed no evidence of such error, but not so the results of the two stars observed by Dr. CHASE in several series with different comparison stars. A crude estimate of such an error can be derived from the parallax values of these two stars which, with weights reduced to Class I, derived from the foregoing table are: —

54 Piscium	$\pi = +0''.241$	Wt. 36.1	Class I	Reduced Wt. 36.1	Residual $+0''.118$	
pp. 13–16	+0.081	42.3	I	42.3	−0.042	
	+0.183	59.5	III	24.4	+0.060	
	+0.054	51.4	I	51.4	−0.069	
Weighted Mean:	$\pi = +0.123$					
Weisse 17^h, 322	$\pi = +0''.218$	Wt. 33.6	Class I	Reduced Wt. 33.6	Residual $+0''.062$	or $+0''.034$
pp. 126–130	+0.182	35.1	I	35.1	+0.026	−0.002
	+0.198	45.9	I	45.9	+0.042	+0.014
	−0.047	38.9	II	22.3	−0.203	——
	+0.127	25.6	II	27.6	−0.029	−0.057
	+0.170	25.6	II	27.6	+0.014	−0.014
Weighted Mean all six series:	$\pi = +0.156$					
" " omitting 4th:	$\pi = +0.184$					

The discrepancy of the fourth series of WEISSE 17^h, 322 was so marked that a fifth and sixth series were made to test the possibility of some error due to non-uniformity in screening or not screening the main star of Mag. 8.0 when observing it with the comparison star *e* of Mag. 8.6. The condition of seeing made it possible to make better observations sometimes with and sometimes without the screen and the necessity of always adhering to the same method in this respect was not appreciated at the time. The fair agreement of the results from the last two series, where both methods were carried out consistently, not only *inter se* but with the results of the first three series shows that the abnormal value found from the fourth series, where the measures agree quite well, must be due to some other cause as yet obscure. It has therefore seemed to us advisable to deduce also a mean value and the residuals for this star, rejecting the fourth series.

We thus find the two values and sets of residuals given above, and using the formula

$$0.455\,\frac{\Sigma p v v}{(n-1)\,\Sigma p} = \frac{\epsilon^2}{\Sigma p} + \frac{\zeta^2}{n}$$

where $\Sigma p v v$ is the sum of the reduced weights into the square of the residual of each parallax value from their mean, Σp the sum of the weights, n the number of series, ϵ the probable error for weight unity, and ζ the probable systematic error of a parallax value for a single series, we obtain the following two values for ζ

$$\zeta = \pm\ 0''.058 \qquad \zeta = \pm\ 0''.036.$$

Without doubt these values are excessive, for the two stars from which they were derived were the only ones of the entire number for which a single series gave a parallax larger than $0''.20$, consequently there is considerable likelihood that these first results were abnormal and it was to test their reality that further series were made.

Probably a more reliable estimate of this systematic error for the stars in general may be inferred from the comparison of our parallax values with those deduced by other observers with recognized accuracy. These are given in the following table:—

Star.	Parallax and Authority.					Difference.
	″		″			″
β Persei	+0.06	Oxford	+0.04	Chase	pp. 37–38	0.02
λ Aurigae	+0.14	Kostinsky	+0.11	"	p. 50	0.03
Piazzi 5^h, 146	+0.09	"	+0.13	"	p. 52	0.04
Lalande 15290	+0.02	Peter	+0.08	"	p. 61	0.06
β Leonis	+0.03	Oxford	+0.12	"	p. 90	0.09
43 Comae Ber.	+0.11	Peter	+0.12	"	p. 99	0.01
Fedorenko 2544	+0.08	"	+0.07	"	p. 107	0.01
Groombridge 2789	−0.02	Hall	−0.03	"	p. 136	0.01
" "	+0.04	Kostinsky	−0.03	"	p. 136	0.07
31 b Aquilae	+0.06	Peter	+0.02	"	p. 137	0.04
γ Cygni	+0.10	Oxford	+0.10	Smith	p. 154	0.00
85 Pegasi	+0.05	Brünnow	+0.10	Chase	p. 182	0.05

The average difference between the Yale values and the others thus amounts to 0.″036, from which, if we attribute equal accuracy to both results, there follows a total probable error for each of ± 0.″017, leading to a very small if not evanescent systematic error.

It must also be recalled that Dr. ELKIN found for his first magnitude stars a systematic error of ± 0.″030, so that on the whole we feel justified in assigning to the present series a value not in excess of this, and in so doing feel confident that we have not underestimated the final probable errors of our results.

The following pages give the collected data and results with the probable errors thus derived for the 163 stars included in this investigation. For WEISSE 17^h, 322 as a compromise between the two values + 0.″17 has been adopted, and for χ Cygni, which was unintentionally observed by SMITH for Lalande 37647, the mean was taken. In the Magnitude column are given those of the Bonn Durchmusterung, Harvard Photometry, Draper Catalogue, and the Spectrum class according to the last. The proper-motions were taken from PORTER and AUWERS' Bradley.

Collected Results.

Page.	Star.	Magnitude. B D.	H.P.	D.C.	Spect.	R. A. 1900.0 h	m	Decl. °	′	Proper-Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
10	Lalande 47231	8.3	—	—	—	0	0.4	+45	16	+0.084	−0.13	0.90	+0.13	±0.050	C.	11
11	Bradley 3212	7.5	—	6.4	H		1.4	28	28	+0.030	−0.20	0.45	+0.14	.037	S.	12
12	Piazzi 0^h, 137	7.5	—	7.0	E		34.0	2	35	+0.049	+0.29	0.79	+0.01	.040	C.	12
13–16	54 Piscium	6.2	5.5	6.5	H		34.2	20	43	−0.034	−0.38	0.61	+0.14	.019	C.	56
17	Lalande 1045	7.0	—	—	—		35.3	39	39	+0.033	−0.72	0.81	+0.01	.046	C.	12
18	Lalande 1198	8.2	—	—	—		40.0	1	15	−0.001	−0.63	0.63	+0.07	.088	C.	11
19	Mayer 20	6.0	5.7	6.1	H?		43.1	4	46	+0.050	−1.15	1.37	+0.16	.048	C.	12
20	Groombridge 145	7.8	—	—	—		43.3	69	54	+0.074	+0.23	0.45	+0.02	.038	C.	12
21	Lalande 1799	8.3	—	—	—		57.2	4	31	+0.027	+0.25	0.47	+0.05	.056	C.	12
22	Lalande 1964	8.4	—	—	—	1	2.2	22	26	+0.008	−0.51	0.52	+0.09	.050	C.	11
23	Lalande 1966	7.8	—	—	—		3.3	61	1	+0.095	0.00	0.69	+0.07	.037	C.	12
24	Lalande 2450	7.9	—	7.0	H		16.9	18	10	+0.040	0.00	0.57	+0.01	.044	C.	12
25	Fedorenko 263	7.4	—	—	—		34.2	66	25	+0.119	−0.23	0.75	+0.03	.043	S., E.	10, 3
26	41 Hev. Andromedae	5.3	5.2	5.7	F		35.7	42	7	+0.073	−0.15	0.82	+0.11	.037	S.	14
27–28	107 Piscium	5.3	5.4	6.0	F		37.1	19	47	−0.021	−0.67	0.73	+0.12	.036	S., E.	13, 17
29	Piazzi 1^h, 159	6.1	—	5.8	G?		40.5	63	22	+0.085	−0.24	0.62	+0.05	.040	S., E.	10, 3
30	Bradley 3227	7.8	—	—	—	2	7.5	67	13	+0.080	−0.30	0.55	+0.09	.041	S., E.	10, 3
31	Lalande 4141	6.5	—	6.5	A		9.7	23	49	+0.042	−0.17	0.60	+0.02	.041	S.	12
32	δ Trianguli	5.0	5.0	5.6	F		10.9	33	46	+0.091	−0.23	1.15	+0.12	.038	S.	13
33–34	Piazzi 2^h, 123	6.5	5.9	5.9	H		30.6	6	25	+0.123	+1.45	2.34	+0.14	.031	S., E.	13, 16
35	Lalande 4855	7.3	—	6.8	H		32.6	30	24	−0.035	−0.40	0.60	+0.01	.041	S.	12
36	Lalande 5490–6	6.7	—	—	—		56.0	61	20	+0.106	−0.67	1.01	+0.05	.038	C.	12
37–38	β Persei (Algol)	Var.	R	B	A	3	1.7	40	34	−0.002	+0.01	0.02	+0.04	.035	C.	25½
39	ι Persei	4.3	4.1	4.9	F		1.8	49	14	+0.127	−0.06	1.25	+0.11	.037	C.	12
40	Lalande 5761	7.9	—	—	—		2.5	25	58	−0.013	−0.88	0.90	−0.00	.038	C.	12
41	Weisse 3^h, 113	7.8	—	—	—		9.4	8	37	+0.031	−0.41	0.62	+0.07	.039	C.	12
42	Nova Persei	—	—	—	—		24.4	43	34	...	...	...	−0.01	.035	C.	21
43	10 Tauri	4.2	4.4	5.0	F		31.8	0	5	−0.016	−0.50	0.55	+0.06	.039	C.	12
44	Lalande 6888–9 pr.	8.2	—	—	—		40.2	41	9	+0.053	−1.24	1.38	+0.04	.045	C.	13
45	Groombridge 745	8.2	—	—	—		48.4	75	53	+0.102	−0.52	0.64	+0.04	.038	C.	12
46	Lalande 7443	8.5	—	—	—		56.5	35	2	+0.140	−1.35	2.19	+0.04	.040	C.	12
47	Groombridge 864	7.1	—	—	—	4	34.5	41	56	+0.052	−0.44	0.73	+0.02	.039	E., C.	3, 12
48	Groombridge 884	6.5	—	6.3	A		44.4	45	41	+0.037	−0.56	0.68	+0.12	.036	E., C.	3, 12
49	104 m Tauri	5.2	5.1	5.5	E	5	1.5	18	31	+0.037	+0.03	0.52	+0.01	.047	C.	12
50	λ Aurigae	4.9	5.0	5.2	F		12.1	40	1	+0.045	−0.66	0.84	+0.11	.041	C.	13
51	Groombridge 990	7.9	—	—	—		30.4	51	23	−0.059	+0.09	0.56	+0.02	.037	C.	12
52	Piazzi 5^h, 146	6.3	—	6.1	I		33.2	53	26	+0.001	−0.55	0.55	+0.13	.042	C.	12
53	Lalande 10797–8	7.1	—	—	—		39.2	37	15	+0.042	−0.52	0.72	+0.07	.037	C.	13
54	Lalande 11196 pr.	7.0	—	—	—		50.3	13	55	+0.032	−0.50	0.68	+0.05	.043	C.	12
55	23 Hev. Camelopardi	5.5	5.5	5.7	F	6	29.2	79	40	−0.025	−0.66	0.66	+0.03	.041	C.	17
56	Weisse 6^h, 1500	8.0	—	—	—		51.4	1	18	+0.007	−0.56	0.57	+0.00	.046	C.	12
57	Lalande 13427	8.2	—	—	—		54.0	48	32	+0.059	−0.40	0.71	+0.01	.050	C.	12
58	Piazzi 6^h, 305	6.3	6.0	6.0	E?		57.2	29	30	+0.013	−0.80	0.82	+0.09	.044	C.	12
59	Lalande 13849	7.0	—	6.2	E?	7	4.2	21	25	−0.011	−0.50	0.52	+0.10	.047	C.	12
60	28 Hev. Camelopardi	6.5	6.4	6.6	I		39.8	80	31	−0.200	+0.02	0.49	−0.01	.036	C.	16
61	Lalande 15290	8.2	—	—	—		47.2	30	55	+0.057	−1.83	1.97	+0.08	.046	C.	12
62	Lalande 15547	8.5	—	—	—		53.7	21	8	+0.015	−0.55	0.59	+0.08	.047	C.	14
63	Lalande 15565	7.5	—	—	—		54.3	29	31	−0.011	−1.18	1.19	+0.03	.042	C.	12
64	Piazzi 7^h, 321	6.7	—	6.8	E	8	5.4	32	46	−0.036	−0.68	0.82	+0.04	.042	C.	12
65	Weisse 8^h, 181–2	8.3	—	—	—		12.0	30	56	−0.024	−0.84	0.89	−0.03	.047	C.	12
66	Lalande 16904	8.1	—	—	—		33.1	56	2	−0.030	−0.36	0.44	−0.05	.040	S., E.	13, 3
67	Lalande 17161	8.2	—	—	—		38.6	42	3	−0.025	−0.63	0.69	−0.08	.048	C.	12
68	55 ρ Cancri	6.0	6.2	6.1	H		46.6	28	43	−0.037	−0.24	0.54	+0.06	.038	C.	12
69	ι Ursae Majoris	3.1	3.2	B	A		52.4	48	26	−0.044	−0.25	0.51	+0.03	.041	S., E.	13, 3
70	10 Ursae Majoris	4.1	4.2	4.4	F		54.2	42	11	−0.040	−0.26	0.52	+0.08	.045	C.	12

Collected Results. — Continued.

Page.	Star.	Magnitude. B.D.	H.P	D.C.	Spect.	R. A. 1900.0 h	m	Decl. °	′	Proper-Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
71	81 π^1 Cancri	7.0	—	6.3	H	9	6.8	+15	24	−0.038	+0.25	0.60	−0.02	±0.042	C.	11
72	Lalande 18286	7.0	—	7.2	E		12.0	29	0	+0.005	−0.52	0.52	+0.00	.039	C.	11
73	Lalande 18397	7.5	—	6.7	H		16.1	40	38	−0.033	−0.40	0.55	+0.05	.044	C.	12
74	d Ursae Majoris	5.2	4.6	5.3	H		25.6	70	16	−0.012	+0.08	0.10	+0.04	.040	C.	10
75	11 Leonis Minoris	5.5	5.3	6.2	H		29.7	36	16	−0.059	−0.27	0.76	−0.02	.039	C.	12
76	Lalande 19229	8.2	—	—	—		43.5	14	14	+0.023	−0.76	0.83	−0.06	.055	C.	12
77	Groombridge 1596	8.2	—	—	—		54.9	56	5	−0.024	−0.44	0.48	+0.06	.050	C.	11
78	Lalande 19821	8.3	—	—	—	10	6.3	24	15	−0.030	+0.09	0.42	+0.04	.037	S., E.	11, 3
79	Lalande 19896	7.8	—	—	—		8.9	3	39	+0.016	−0.40	0.47	−0.13	.044	S., E.	11, 3
80	39 Leonis	6.5	—	6.4	E		11.7	23	36	−0.032	−0.10	0.45	+0.08	.040	S., E.	11, 3
81	μ Ursae Majoris	3.1	3.1	4.9	M		16.4	42	0	−0.008	+0.03	0.10	+0.04	.037	C.	15
82	Lalande 20881	7.9	—	—	—		46.1	20	49	−0.018	−0.43	0.50	−0.00	.046	C.	15
83	Groombridge 1697	6.0	6.1	6.3	H		46.7	70	23	−0.081	−0.07	0.41	−0.02	.037	C.	14
84	Lalande 21008–10	8.3	—	—	—		50.9	28	17	−0.036	−0.13	0.49	+0.04	.055	C.	11
85	51 Leonis Minoris	7.8	—	—	—		59.9	25	45	−0.033	−0.08	0.46	+0.03	.051	C.	12
86	Lalande 21368	8.5	—	—	—	11	5.6	31	0	+0.042	−0.20	0.58	+0.04	.045	E., C.	3, 12
87	Groombridge 1757	6.0	6.0	6.7	H		11.1	50	1	−0.009	−0.01	0.09	−0.09	.041	C.	10
88	ξ Ursae Majoris	3.7	3.8	4.7	G		12.8	32	6	−0.037	−0.57	0.74	+0.17	.042	E., C.	3, 12
89	83 Leonis pr.	7.5	6.1	6.3	I		21.7	3	33	−0.049	+0.17	0.75	−0.04	.043	C.	12
90	β Leonis	2.0	2.2	B	A		44.0	15	8	−0.036	−0.10	0.53	+0.12	.043	C.	13
91	β Virginis	3.3	3.7	4.4	G		45.5	2	20	+0.048	−0.26	0.77	+0.11	.047	C.	12
92	Lalande 22908	8.0	—	—	—	12	8.1	11	24	+0 002	−0.59	0.59	+0.08	.046	C.	11
93	8 Canum Venaticorum	4.5	4.3	5.2	F		29.0	41	54	−0.065	+0.29	0.78	+0.09	.038	E., C.	3, 12
94	33 Virginis	6.4	5.9	6.4	H		41.3	10	6	+0.018	−0.45	0.52	−0.12	.049	C.	12
95	Lalande 23917	8.2	—	—	—		44.6	1	45	−0.002	−0.68	0.68	+0.01	.049	C.	12
96	δ Virginis	3.0	3.7	5.4	M		50.6	3	56	−0.034	−0.05	0.51	−0.04	.039	C.	12
97	Lalande 24414–6	6.8	—	6.7	H	13	3.8	5	46	+0.004	−0.72	0.72	−0.00	.048	C.	12
98	Lalande 24504	8.5	—	—	—		6.4	10	9	−0.033	+0.25	0.56	+0.02	.051	C.	11
99	43 Comae Berenices	5.0	4.4	5 2	F		7.2	28	23	−0.060	+0.90	1.20	+0.12	.052	C.	11
100	Weisse 13^h, 241	9.0	—	—	—		14.9	35	39	+0.033	−0.83	0.92	+0.07	.052	C.	12
101	Weisse 13^h, 216	8.5	—	—	—		15.7	4	39	−0.036	+0.22	0.58	−0.03	.055	C.	10
102	Lalande 24774	8.0	—	—	—		16.1	43	38	−0.041	−0.06	0.45	+0.17	.044	C.	11
103	70 Virginis	5.5	5.2	5.6	F		23.5	14	19	−0.018	−0.58	0.63	+0.14	.049	E.	11
104	Lalande 25372	8.5	—	—	—		40.7	15	26	+0.125	−1.47	2.32	+0.17	.055	E	11
105	τ Bootis	4.6	4.5	5 2	F		42.5	17	57	−0.035	+0.04	0.50	+0.03	.055	E.	11
106	Lalande 26289	6.5	6.3	6.4	E?	14	18.1	1	43	+0.015	−0.50	0.55	−0.02	.041	S., E.	10, 6
107	Fedorenko 2544	7.7	—	—	—		52.3	54	4	−0.110	+0.48	1.08	+0.07	.040	C.	13
108	Lalande 27742	6.7	—	—	—	15	8.3	19	39	−0.043	+0.30	0.68	+0.04	.040	S., E.	9, 6
109	5 Serpentis	5.0	5.1	5.3	F		14.2	2	9	+0.024	−0.54	0.65	+0.20	.044	S., E.	9, 5
110	Lalande 27958	8.0	—	—	—		14.8	26	4	−0.037	−0.11	0.51	+0.02	.039	C.	13
111	Weisse 15^h, 268	8.7	—	—	—		17.7	1	47	−0.027	−0.33	0.52	+0.11	.050	C.	12
112	39 Serpentis	6.3	—	—	—		48.5	13	31	−0.012	−0.58	0.60	+0.03	.038	C.	12
113	χ Herculis	4.3	4.5	5.3	F		49.2	42	44	+0.039	+0.61	0.75	+0.09	.037	C.	12
114	γ Serpentis	3.8	4.0	4.5	F		51.8	15	59	+0.019	−1.29	1.32	+0.09	.043	C.	12
115	ρ Coronae borealis	5.7	5.2	6.1	F		57.2	33	36	−0.016	−0.79	0.82	+0.02	.045	C.	12
116	Groombridge 2305	6.5	—	—	—	16	1.5	39	26	−0.048	+0.05	0.56	+0.06	.037	C.	12
117	Lalande 29439	8.4	—	—	—		2.9	38	55	+0.018	−0.56	0.60	+0.04	.040	C.	11½
118	Lalande 29437–8	6.5	—	—	—		4.3	6	40	+0.016	−0.75	0.79	+0.00	.039	C.	13
119	Lalande 30024–6	7.0	—	—	—		24.5	18	37	−0.021	+0.38	0.48	+0.08	.044	C.	12
120	Lalande 30044–5	7.6	—	—	—		25.6	4	26	−0.030	−1.39	1.46	+0.00	.073	C.	12
121	ζ Herculis	3.0	3.1	3.9	G		37.5	31	47	−0.036	+0.41	0.62	+0.17	.040	S.	12
122	Lalande 30699	7.6	—	7.0	H		42.9	68	16	−0.046	+0.40	0.48	+0.04	.037	S.	12
123	Lalande 30694	7.0	—	—	—		47.9	0	11	−0.049	−1.49	1.66	+0.13	.048	C.	12
124	Lalande 31132	6.6	—	—	—		59.8	47	12	+0.013	+0.82	0.83	+0.13	.038	S.	12
125	72 w Herculis	5.7	5.4	5.9	E	17	16.9	32	36	+0.010	−1.05	1.06	+0.14	.036	C.	12

Collected Results. — Continued.

Page.	Star.	Magnitude. B.D.	H.P.	D.C.	Spect.	R. A. 1900.0 h	m	Decl. °	′	Proper-Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
126–130	Weisse 17^h, 322	8.0	—	—	—	17	20.8	+ 2	14	−0.040	−1.22	1.36	+0.17	±.017	C.	82
131	Fedorenko 2895	6.5	—	6.7	H		25.3	67	23	−0.091	+0.03	0.53	+0.04	.037	C.	12
132	Weisse 17^h, 514	8.5	—	—	—		29.9	6	4	−0.030	+0.36	0.58	−0.01	.050	C.	10
133	26 Draconis	6.0	5.3	6.0	F		34.0	61	57	+0.035	−0.50	0.56	+0.08	.036	C.	12
134	μ Herculis	3.5	3.5	4.4	I?		42.5	27	47	−0.024	−0.74	0.81	+0.12	.038	C.	12
135	χ Draconis	3.8	3.7	4.2	F	18	22.9	72	41	+0.113	−0.37	0.62	+0.11	.038	C.	12
136	Groombridge 2789pr.	6.2	5.8	6.4	H	19	9.5	49	40	−0.014	+0.61	0.62	−0.03	.039	C.	13
137	31 b Aquilae	5.5	5.3	6.0	H		20.2	11	44	+0.049	+0.63	0.96	+0.02	.037	C.	14
138	Bradley 2459	6.1	6.0	6.2	H		21.3	24	44	−0.015	−0.63	0.66	+0.05	.038	C.	12
139	β^1 Cygni	3.0	3.0	—	Q?		26.7	27	45	−0.002	−0.02	0.03	−0.03	.039	C.	16
140	β^2 Cygni	6.5	—	4.3	A?		26.7	27	45	−0.002	−0.02	0.03	−0.03	.039	C.	16
141	Groombridge 2875	6.4	—	—	—		29.5	58	23	−0.066	−0.40	0.66	−0.06	.049	C.	12
142	Lalande 37120–1	7.0	—	6.4	H		29.7	32	59	−0.035	+0.20	0.48	+0.05	.039	C.	11
143	θ Cygni	4.9	4.6	5.1	F?		33.8	49	59	−0.003	+0.24	0.24	+0.06	.035	C.	14
144	Groombridge 2909	5.5	5.1	5.6	F?		37.7	45	17	−0.015	−0.10	0.14	−0.01	.036	C.	14
145–146	χ Cygni	5.4	5.0	5.6	F		42.6	33	30	0.000	−0.47	0.47	+0.01	.026	C., S.	12, 14
147	Lalande 38287	7.0	—	—	—		58.0	15	20	−0.013	−0.57	0.60	+0.08	.038	C.	12
148	Lalande 38380	6.0	5.8	6.4	H		59.5	29	38	+0.052	−0.52	0.86	+0.03	.042	C.	12
149	15 Sagittae	5.5	6.0	6.1	E		59.6	16	48	−0.028	−0.42	0.58	+0.16	.076	C.	12
150	Lalande 38383	7.0	—	—	—		59.7	23	5	−0.074	−0.94	1.39	+0.10	.043	C.	12
151	Groombridge 3042	5.9	5.7	6.0	A	20	3.6	52	52	+0.024	+0.24	0.33	+0.05	.036	C.	14
152	Piazzi 20^h, 23	7.0	—	—	—		6.6	15	53	−0.029	+0.36	0.55	+0.07	.042	C.	12
153	Groombridge 3150	6.2	6.2	6.1	E?		16.5	66	32	+0.080	+0.31	0.57	+0.11	.037	C.	12
154	γ Cygni	2.8	2.3	3.2	Q		18.6	39	56	−0.000	+0.02	0.02	+0.10	.038	S.	14
155	Groombridge 3215	6.7	—	—	—		29.3	41	33	−0.014	+0.45	0.48	−0.02	.035	C.	15
156	Lalande 39866	8.4	—	—	—		34.6	4	37	+0.057	+0.05	0.85	+0.05	.047	C.	12
157	Groombridge 3263	6.2	5.9	6.2	F		38.2	60	9	+0.001	+0.19	0.19	+0.01	.036	C.	14
158	Fedorenko 3562–3	7.2	—	—	—		38.7	75	14	+0.091	+0.54	0.64	+0.05	.037	C.	12
159	6 Hev. Cephei	4.5	4.6	5.3	F		42.9	57	13	−0.012	−0.25	0.27	+0.00	.036	C.	14
160	η Cephei	3.7	3.6	4.9	K		43.3	61	27	+0.012	+0.81	0.82	+0.09	.037	S.	13
161	Fedorenko 3638	7.8	—	—	—		52.4	74	23	+0.106	+0.55	0.70	−0.02	.040	C.	12
162	Weisse 20^h, 1454	8.2	—	—	—		59.1	2	36	−0.025	−0.41	0.55	−0.13	.048	S.	12
163	Lalande 40844	8.8	—	—	—	21	0.4	6	41	+0.002	−0.57	0.57	+0.16	.054	E.	11
164	Weisse 21^h, 97	7.3	—	—	—		7.4	17	21	−0.009	−0.90	0.91	−0.13	.055	E.	11
165	ρ Cygni	4.1	4.2	5.1	L?		30.2	45	9	−0.003	−0.10	0.11	+0.04	.036	C.	14
166	72 Cygni	5.0	5.0	6.0	H		30.7	38	5	+0.009	+0.10	0.15	−0.03	.035	C.	14
167	Lalande 42883–5	7.4	—	—	—		54.3	29	21	−0.029	−0.41	0.56	+0.02	.043	C.	11
168	Groombridge 3689	7.9	—	—	—	22	3.1	52	39	−0.055	−0.35	0.61	+0.03	.047	S.	10
169	Lalande 43492	7.0	—	6.6	A?		12.3	12	24	+0.057	+0.09	0.84	+0.14	.065	C.	11
170	31 Cephei	5.5	5.3	5.5	F		33.3	73	7	+0.042	+0.02	0.18	−0.04	.040	C.	13
171	Piazzi 22^h, 214	7.2	—	—	—		40.9	29	56	−0.021	−0.39	0.48	−0.03	.038	C.	12
172	ξ Pegasi	4.8	4.1	5.1	F		41.7	11	40	+0.013	−0.51	0.54	+0.08	.047	C.	12
173	σ Pegasi	5.0	5.3	5.6	F		47.3	9	18	+0.034	+0.04	0.50	+0.01	.081	C.	12
174	Fedorenko 4371	7.5	—	—	—	23	1.2	67	52	+0.102	+0.15	0.60	+0.05	.049	C.	10
175	γ Piscium	3.8	3.8	5.0	I		12.0	2	44	+0.049	+0.02	0.73	−0.05	.044	C.	12
176	Piazzi 23^h, 43	8.5	—	—	—		13.8	4	52	+0.031	−0.12	0.48	+0.01	.060	E.	12
177	Lalande 45755	7.3	—	6.4	A		16.8	43	33	+0.058	+0.22	0.67	+0.03	.037	C.	12
178	λ Andromedae	3.5	4.0	5.0	K		32.7	45	55	+0.016	−0.42	0.45	−0.02	.038	S.	12
179	ι Piscium	4.2	4.3	5.0	F		34.8	5	5	+0.023	−0.44	0.56	+0.14	.059	E.	12
180	Piazzi 23^h, 164	7.5	—	6.7	H		38.5	57	31	+0.047	+0.49	0.62	−0.09	.038	C.	13
181	Lalande 46650	8.7	—	—	—		44.0	1	52	+0.065	−1.00	1.39	+0.20	.061	E.	11
182	85 Pegasi	6.1	5.7	6.3	E		56.9	26	33	+0.062	−0.99	1.29	+0.10	.045	C.	11
183	Piazzi 23^h, 267	6.3	—	6.5	F		59.7	34	6	+0.062	+0.08	0.77	−0.00	.043	C.	12

§ 6. General Conclusions.

The present investigation furnishing, as it seems to us, a homogeneous series of parallax values, we have thought it of interest to make a number of classifications of the results independent of the material hitherto obtained by other observers. While we cannot claim any very great precision for the individual results, determined as these are from such a comparatively limited number of observations, yet we do attach considerable weight to the mean values of the various groups we have formed, and consider these values of unquestionable significance.

These classifications are comprised in the five following tables. Table I gives an arrangement in order of the size of the proper-motion of the star under consideration; Table II, a similar one in order of the star's magnitude; Table III, in order of the size of the parallax; Table IV, in order of Right-Ascension, subdivided into two classes north and south of Declinations + 30°, and finally Table V, according to the spectral type and classes as given in the Draper Catalogue. We have thought it desirable and entirely permissible to include in Tables I, II, and V the values deduced by Dr. Elkin for the ten First Magnitude Stars in the northern hemisphere, as these series are in every essential strictly comparable with the present ones. These data are:

First Magnitude Stars.

Star.	Magnitude. B. D.	H. P.	D. C.	Spect.	R. A. 1900.0	Decl.	Proper-Motion. R. A.	Decl.	Total	Parallax.	Prob. Error.	Observer.	No. Obs.
					h. m.	° ′	s	″	″	″	″		
α Tauri	1.1	1.0	3.9	K?	4 30.2	+16 19	+0.004	−0.19	0.20	+0.11	±0.014	E.	151
α Aurigae	1.0	0.2	B	F	5 9.3	45 54	+0.005	−0.42	0.44	+0.08	.021	E.	67
α Orionis	Var.	0.8	B	M?	5 49.8	7 23	+0.001	+0.02	0.02	+0.02	.024	E.	48
α Canis Min.	1.0	0.6	B	F	7 34.1	5 30	−0.047	−1.03	1.23	+0.33	.015	E.	128
β Geminorum	1.3	1.2	B	K?	7 39.2	28 16	−0.048	−0.05	0.63	+0.06	.023	E.	48
α Leonis	1.3	1.4	B	A	10 3.1	12 28	−0.018	+0.02	0.26	+0.02	.020	E.	74
α Bootis	1.0	0.0	B	K	14 11.1	19 42	−0.080	−1.98	2.29	+0.03	.017	E.	125
α Lyrae	1.0	0.4	B	A	18 33.6	38 41	+0.017	+0.30	0.34	+0.08	.016	E.	133
α Aquilae	1.2	1.0	B	A	19 45.9	8 36	+0.035	+0.38	0.65	+0.23	.019	E.	79
α Cygni	1.7	1.5	B	A	20 38.0	44 56	−0.001	+0.00	0.01	−0.01	.023	E.	49

For β *Persei* and *Nova Persei* we have taken the magnitudes as they were in the mean at the epochs of observation, viz., 2.3 and 4.9; for the first magnitude stars the H. P. values were adopted.

Table I. Results arranged according to Proper-Motion.

P. M. : 0.″00 — 0.″34				P. M. : 0.″41 — 0.″54				P. M. : 0.″55 — 0.″65				P. M. : 0.″66 — 0.″96				P. M. : 1.″01 — 2.″34			
Page	Mag.	P. M.	Par.	Page	Mag.	P. M.	Par.	Page	Mag.	P. M.	Par.	Page	Mag.	P. M.	Par.	Page	Mag.	P. M.	Par.
		″	″			″	″			″	″			″	″			″	″
38	2.3	0.02	+0.04	11	7.5	0.45	+0.14	13–16	6.2	0.61	+0.14	10	8.3	0.90	+0.13	19	6.0	1.37	+0.16
42	4.9	0.00	−0.01	20	7.8	0.45	+0.02	18	8.2	0.63	+0.07	12	7.5	0.79	+0.01	32	5.0	1.15	+0.12
74	5.2	0.10	+0.04	21	8.3	0.47	+0.05	24	7.9	0.57	+0.01	17	7.0	0.81	+0.01	33–34	6.5	2.34	+0.14
81	3.1	0.10	+0.04	22	8.4	0.52	+0.09	29	6.1	0.62	+0.05	23	7.8	0.69	+0.07	36	6.7	1.01	+0.05
87	6.0	0.09	−0.09	49	5.2	0.52	+0.01	30	7.8	0.55	+0.09	25	7.4	0.75	+0.03	39	4.3	1.25	+0.11
139	3.0	0.03	−0.03	59	7.0	0.52	+0.10	31	6.5	0.60	+0.02	26	5.3	0.82	+0.11	44	8.2	1.38	+0.04
140	6.5	0.03	−0.03	60	6.5	0.49	−0.01	35	7.3	0.60	+0.01	28	5.3	0.73	+0.12	46	8.5	2.19	+0.04
143	4.9	0.24	+0.06	66	8.1	0.44	−0.05	41	7.8	0.62	+0.07	40	7.9	0.90	−0.00	61	8.2	1.97	+0.08
144	5.5	0.14	−0.01	68	6.0	0.54	+0.06	43	4.2	0.55	+0.06	47	7.1	0.73	+0.02	63	7.5	1.19	+0.03
151	5.9	0.33	+0.05	69	3.1	0.51	+0.03	45	8.2	0.64	+0.04	48	6.5	0.68	+0.12	99	5.0	1.20	+0.12
154	2.8	0.02	+0.10	70	4.1	0.52	+0.08	51	7.9	0.56	+0.02	50	4.9	0.84	+0.11	104	8.5	2.32	+0.17
157	6.2	0.19	+0.01	72	7.0	0.52	+0.00	52	6.3	0.55	+0.13	53	7.1	0.72	+0.07	107	7.7	1.08	+0.07
159	4.5	0.27	+0.03	77	8.2	0.48	+0.06	56	8.0	0.57	+0.00	54	7.0	0.68	+0.05	114	3.8	1.32	+0.09
165	4.1	0.11	+0.04	78	8.3	0.42	+0.04	62	8.5	0.59	+0.08	55	5.5	0.66	+0.03	120	7.6	1.46	+0.00
166	5.0	0.15	−0.03	79	7.8	0.47	−0.13	71	7.0	0.60	−0.02	57	8.2	0.71	+0.01	123	7.0	1.66	+0.13
170	5.5	0.18	−0.04	80	6.5	0.45	+0.08	73	7.5	0.55	+0.05	58	6.3	0.82	+0.09	125	5.7	1.06	+0.14
Vol. I.				82	7.9	0.50	−0.00	86	8.5	0.58	+0.04	64	6.7	0.82	+0.04	126–130	8.0	1.36	+0.17
328	1.0	0.20	+0.11	83	6.0	0.41	−0.02	92	8.0	0.59	+0.08	65	8.3	0.89	−0.03	150	7.0	1.39	+0.10
"	0.8	0.02	+0.02	84	8.3	0.49	+0.04	98	8.5	0.56	+0.02	67	8.2	0.69	−0.08	181	8.7	1.39	+0.20
"	1.4	0.26	+0.02	85	7.8	0.46	+0.03	101	8.5	0.58	−0.03	75	5.5	0.76	−0.02	182	6.1	1.29	+0.10
"	0.4	0.34	+0.08	90	2.0	0.53	+0.12	103	5.5	0.63	+0.14	76	8.2	0.83	−0.06	Vol. I.			
"	1.5	0.01	−0.01	94	6.4	0.52	−0.12	106	6.5	0.55	−0.02	88	3.7	0.74	+0.17	328	0.6	1.23	+0.33
				96	3.0	0.51	−0.04	109	5.0	0.65	+0.20	89	7.5	0.75	−0.04	"	0.0	2.29	+0.03
				102	8.0	0.45	+0.17	112	6.3	0.60	+0.03	91	3.3	0.77	+0.11				
				105	4.6	0.50	+0.03	116	6.5	0.56	+0.06	93	4.5	0.78	+0.09				
				110	8.0	0.51	+0.02	117	8.4	0.60	+0.04	95	8.2	0.68	+0.01				
				111	8.7	0.52	+0.11	121	3.0	0.62	+0.17	97	6.8	0.72	−0.00				
				119	7.0	0.48	+0.08	132	8.5	0.58	−0.01	100	9.0	0.92	+0.07				
				122	7.6	0.48	+0.04	133	6.0	0.56	+0.08	108	6.7	0.68	+0.04				
				131	6.5	0.53	+0.04	135	3.8	0.62	+0.11	113	4.3	0.75	+0.09				
				142	7 0	0.48	+0.05	136	6.2	0.62	−0.03	115	5.7	0.82	+0.02				
				145–146	5.4	0.47	+0.01	147	7.0	0.60	+0.08	118	6.5	0.79	+0.00				
				155	6.7	0.48	−0.02	149	5.5	0.58	+0.16	124	6.6	0.83	+0.13				
				171	7.2	0.48	−0.03	152	7.0	0.55	+0.07	134	3.5	0.81	+0.12				
				172	4.8	0.54	+0.08	153	6.2	0.57	+0.11	137	5.5	0.96	+0.02				
				173	5.0	0.50	+0.01	158	7.2	0.64	+0.05	138	6.1	0.66	+0.05				
				176	8.5	0.48	+0.01	162	8.2	0.55	−0.13	141	6.4	0.66	−0.06				
				178	3.5	0.45	−0.02	163	8.8	0.57	+0.16	148	6.0	0.86	+0.03				
				Vol. I.				167	7.4	0.56	+0.02	156	8.4	0.85	+0.05				
				328	0.2	0.44	+0.08	168	7.9	0.61	+0.03	160	3.7	0.82	+0.09				
								174	7.5	0.60	+0.05	161	7.8	0.70	−0.02				
								179	4.2	0.56	+0.14	164	7.3	0.91	−0.13				
								180	7.5	0.62	−0.09	169	7.0	0.84	+0.14				
								Vol. I.				175	3.8	0.73	−0.05				
								328	1.2	0.63	+0.06	177	7.3	0.67	+0.03				
								"	1.0	0.65	+0.23	183	6.3	0.77	−0.00				
Number of stars 21				Number of stars 39				Number of stars 45				Number of stars 46				Number of stars 22			
Average Mag. 3.8				Average Mag. 6.3				Average Mag. 6.7				Average Mag. 6.5				Average Mag. 6.2			
" P. M. ″0.14				" P. M. ″0.49				" P. M. ″0.59				" P. M. ″0.77				" P. M. ″1.50			
" Par. +″0.019				" Par. +″0.032				" Par. +″0.059				" Par. +″0.039				" Par. +″0.109			

Table II. Results arranged according to Stellar Magnitude.

Mag.: 0.0 — 1.5			
Page.	Mag.	P. M.	Par.
Vol. I			
328	1.0	0.20	+0.11
"	0.2	0.44	+0.08
"	0.8	0.02	+0.02
"	0.6	1.23	+0.33
"	1.2	0.63	+0.06
"	1.4	0.26	+0.02
"	0.0	2.29	+0.03
"	0.4	0.34	+0.08
"	1.0	0.65	+0.23
"	1.5	0.01	−0.01
Number of stars 10			
Average Mag. 0.8			
"	P. M. 0.61		
"	Par. + 0.095		

Mag.: 2.0 — 4.9			
38	2.3	0.02	+0.04
39	4.3	1.25	+0.11
42	4.9	0.00	−0.01
43	4.2	0.55	+0.06
50	4.9	0.84	+0.11
69	3.1	0.51	+0.03
70	4.1	0.52	+0.08
81	3.1	0.10	+0.04
88	3.7	0.74	+0.17
90	2.0	0.53	+0.12
91	3.3	0.77	+0.11
93	4.5	0.78	+0.09
96	3.0	0.51	−0.04
105	4.6	0.50	+0.03
113	4.3	0.75	+0.09
114	3.8	1.32	+0.09
121	3.0	0.62	+0.17
134	3.5	0.81	+0.12
135	3.8	0.62	+0.11
139	3.0	0.03	−0.03
143	4.9	0.24	+0.06
154	2.8	0.02	+0.10
159	4.5	0.27	+0.00
160	3.7	0.82	+0.09
165	4.1	0.11	+0.04
172	4.8	0.54	+0.08
175	3.8	0.73	−0.05
178	3.5	0.45	−0.02
179	4.2	0.56	+0.14
Number of stars 29			
Average Mag. 3.8			
"	P. M. 0.53		
"	Par. +0.066		

Mag.: 5.0 — 6.2			
Page.	Mag.	P. M.	Par.
13–16	6.2	0.61	+0.14
19	6.0	1.37	+0.16
26	5.3	0.82	+0.11
27–28	5.3	0.73	+0.12
29	6.1	0.62	+0.05
32	5.0	1.15	+0.12
49	5.2	0.52	+0.01
55	5.5	0.66	+0.03
68	6.0	0.54	+0.06
74	5.2	0.10	+0.04
75	5.5	0.76	−0.02
83	6.0	0.41	−0.02
87	6.0	0.09	−0.09
99	5.0	1.20	+0.12
103	5.5	0.63	+0.14
109	5.0	0.65	+0.20
115	5.7	0.82	+0.02
125	5.7	1.06	+0.14
133	6.0	0.56	+0.08
136	6.2	0.62	−0.03
137	5.5	0.96	+0.02
138	6.1	0.66	+0.05
144	5.5	0.14	−0.01
145–146	5.4	0.47	+0.01
148	6.0	0.86	+0.03
149	5.5	0.58	+0.16
151	5.9	0.33	+0.05
153	6.2	0.57	+0.11
157	6.2	0.19	+0.01
166	5.0	0.15	−0.03
170	5.5	0.18	−0.04
173	5.0	0.50	+0.01
182	6.1	1.29	+0.10
Number of stars 33			
Average Mag. 5.6			
"	P. M. 0.63		
"	Par. +0.056		

Mag.: 6.3 — 7.0			
Page.	Mag.	P. M.	Par.
17	7.0	0.81	+0.01
31	6.5	0.60	+0.02
33–34	6.5	2.34	+0.14
36	6.7	1.01	+0.05
48	6.5	0.68	+0.12
52	6.3	0.55	+0.13
54	7.0	0.68	+0.05
58	6.3	0.82	+0.09
59	7.0	0.52	+0.10
60	6.5	0.49	−0.01
64	6.7	0.82	+0.04
71	7.0	0.60	−0.02
72	7.0	0.52	+0.00
80	6.5	0.45	+0.08
94	6.4	0.52	−0.12
97	6.8	0.72	−0.00
106	6.5	0.54	−0.02
108	6.7	0.68	+0.04
112	6.3	0.60	+0.03
116	6.5	0.56	+0.06
118	6.5	0.79	+0.00
119	7.0	0.48	+0.08
123	7.0	1.66	+0.13
124	6.6	0.83	+0.13
131	6.5	0.53	+0.04
140	6.5	0.03	−0.03
141	6.4	0.66	−0.06
142	7.0	0.48	+0.05
147	7.0	0.60	+0.08
150	7.0	1.39	+0.10
152	7.0	0.55	+0.07
155	6.7	0.48	−0.02
169	7.0	0.84	+0.14
183	6.3	0.77	−0.00
Number of stars 34			
Average Mag. 6.7			
"	P. M. 0.73		
"	Par. +0.045		

Mag.: 7.1 — 7.9			
Page.	Mag.	P. M.	Par.
11	7.5	0.45	+0.14
12	7.5	0.79	+0.01
20	7.8	0.45	+0.02
23	7.8	0.69	+0.07
24	7.9	0.57	+0.01
25	7.4	0.75	+0.03
30	7.8	0.55	+0.09
35	7.3	0.60	+0.01
40	7.9	0.90	−0.00
41	7.8	0.62	+0.07
47	7.1	0.73	+0.02
51	7.9	0.56	+0.02
53	7.1	0.72	+0.07
63	7.5	1.19	+0.03
73	7.5	0.55	+0.05
79	7.8	0.47	−0.13
82	7.9	0.50	−0.00
85	7.8	0.46	+0.03
89	7.5	0.75	−0.04
107	7.7	1.08	+0.07
120	7.6	1.46	+0.00
122	7.6	0.48	+0.04
158	7.2	0.64	+0.05
161	7.8	0.70	−0.02
164	7.3	0.91	−0.13
167	7.4	0.56	+0.02
168	7.9	0.61	+0.03
171	7.2	0.48	−0.03
174	7.5	0.60	+0.05
177	7.3	0.67	+0.03
180	7.5	0.62	−0.09
Number of stars 31			
Average Mag. 7.6			
"	P. M. 0.68		
"	Par. +0.017		

Mag.: 8.0 — 9.0			
Page.	Mag.	P. M.	Par.
10	8.3	0.90	+0.13
18	8.2	0.63	+0.07
21	8.3	0.47	+0.05
22	8.4	0.52	+0.09
44	8.2	1.38	+0.04
45	8.2	0.64	+0.04
46	8.5	2.19	+0.04
56	8.0	0.57	+0.00
57	8.2	0.71	+0.01
61	8.2	1.97	+0.08
62	8.5	0.59	+0.08
65	8.3	0.89	−0.03
66	8.1	0.44	−0.05
67	8.2	0.69	−0.08
76	8.2	0.83	−0.06
77	8.2	0.48	+0.06
78	8.3	0.42	+0.04
84	8.3	0.49	+0.04
86	8.5	0.58	+0.04
92	8.0	0.59	+0.08
95	8.2	0.68	+0.01
98	8.5	0.56	+0.02
100	9.0	0.92	+0.07
101	8.5	0.58	−0.03
102	8.0	0.45	+0.17
104	8.5	2.32	+0.17
110	8.0	0.51	+0.02
111	8.7	0.52	+0.11
117	8.4	0.60	+0.04
126–130	8.0	1.36	+0.17
132	8.5	0.58	−0.01
156	8.4	0.85	+0.05
162	8.2	0.55	−0.13
163	8.8	0.57	+0.16
176	8.5	0.48	+0.01
181	8.7	1.39	+0.20
Number of stars 36			
Average Mag. 8.3			
"	P. M. 0.80		
"	Par. +0.047		

Table III. Results arranged according to size of Parallax.

Par. : −0.″13 to −0.″07

Page	Mag.	P. M.	Par.
		″	″
67	8.2	0.69	−0.08
79	7.8	0.47	−0.13
87	6.0	0.09	−0.09
94	6.4	0.52	−0.12
162	8.2	0.55	−0.13
164	7.3	0.91	−0.13
180	7.5	0.62	−0.09

Number of stars 7
Average Mag. 7.3
" P. M. 0.″55
" Par. −0.″110

Par. : −0.″06 to −0.″00

Page	Mag.	P. M.	Par.
		″	″
40	7.9	0.90	−0.00
42	4.9	0.00	−0.01
60	6.5	0.49	−0.01
65	8.3	0.89	−0.03
66	8.1	0.44	−0.05
71	7.0	0.60	−0.02
75	5.5	0.76	−0.02
76	8.2	0.83	−0.06
82	7.9	0.50	−0.00
83	6.0	0.41	−0.02
89	7.5	0.75	−0.04
96	3.0	0.51	−0.04
97	6.8	0.72	−0.00
101	8.5	0.58	−0.03
106	6.5	0.55	−0.02
132	8.5	0.58	−0.01
136	6.2	0.62	−0.03
139	3.0	0.03	−0.03
140	6.5	0.03	−0.03
141	6.4	0.66	−0.06
144	5.5	0.14	−0.01
155	6.7	0.48	−0.02
161	7.8	0.70	−0.02
166	5.0	0.15	−0.03
170	5.5	0.18	−0.04
171	7.2	0.48	−0.03
175	3.8	0.73	−0.05
178	3.5	0.45	−0.02
183	6.3	0.77	−0.00

Number of stars 29
Average Mag. 6.4
" P. M. 0.″52
" Par. −0.″025

Par. : +0.″00 to +0.″06

Page	Mag.	P. M.	Par.
		″	″
12	7.5	0.79	+0.01
17	7.0	0.81	+0.01
20	7.8	0.45	+0.02
21	8.3	0.47	+0.05
24	7.9	0.57	+0.01
25	7.4	0.75	+0.03
29	6.1	0.62	+0.05
31	6.5	0.60	+0.02
35	7.3	0.60	+0.01
36	6.7	1.01	+0.05
37–38	2.3	0.02	+0.04
43	4.2	0.55	+0.06
44	8.2	1.38	+0.04
45	8.2	0.64	+0.04
46	8.5	2.19	+0.04
47	7.1	0.73	+0.02
49	5.2	0.52	+0.01
51	7.9	0.56	+0.02
54	7.0	0.68	+0.05
55	5.5	0.66	+0.03
56	8.0	0.57	+0.00
57	8.2	0.71	+0.01
63	7.5	1.19	+0.03
64	6.7	0.82	+0.04
68	6.0	0.54	+0.06
69	3.1	0.51	+0.03
72	7.0	0.52	+0.00
73	7.5	0.55	+0.05
74	5.2	0.10	+0.04
77	8.2	0.43	+0.06
78	8.3	0.42	+0.04
81	3.1	0.10	+0.04
84	8.3	0.49	+0.04
85	7.8	0.46	+0.03
86	8.5	0.58	+0.04
95	8.2	0.68	+0.01
98	8.5	0.56	+0.02
105	4.6	0.50	+0.03
108	6.7	0.68	+0.04
110	8.0	0.51	+0.02
112	6.3	0.60	+0.03
115	5.7	0.82	+0.02
116	6.5	0.56	+0.06
117	8.4	0.60	+0.04
118	6.5	0.79	+0.00
120	7.6	1.46	+0.00
122	7.6	0.48	+0.04
131	6.5	0.53	+0.04
137	5.5	0.96	+0.02
138	6.1	0.66	+0.05
142	7.0	0.48	+0.05
143	4.9	0.24	+0.06
145–146	5.4	0.47	+0.01
148	6.0	0.86	+0.03
151	5.9	0.33	+0.05

Par. : +0.″00 to +0.″05

Page	Mag.	P. M.	Par.
		″	″
156	8.4	0.85	+0.05
157	6.2	0.19	+0.01
158	7.2	0.64	+0.05
159	4.5	0.27	+0.00
165	4.1	0.11	+0.04
167	7.4	0.56	+0.02
168	7.9	0.61	+0.03
173	5.0	0.50	+0.01
174	7.5	0.60	+0.05
176	8.5	0.48	+0.01
177	7.3	0.67	+0.03

Number of stars 66 Average P. M. 0.″62
Average Mag. 6.8 " Par. +0.″031

Par. : +0.″07 to +0.″13

Page	Mag.	P. M.	Par.
		″	″
10	8.3	0.90	+0.13
18	8.2	0.63	+0.07
22	8.4	0.52	+0.09
23	7.8	0.69	+0.07
26	5.3	0.82	+0.11
27–28	5.3	0.73	+0.12
30	7.8	0.55	+0.09
32	5.0	1.15	+0.12
39	4.3	1.25	+0.11
41	7.8	0.62	+0.07
48	6.5	0.68	+0.12
50	4.9	0.84	+0.11
52	6.3	0.55	+0.13
53	7.1	0.72	+0.07
58	6.3	0.82	+0.09
59	7.0	0.52	+0.10
61	8.2	1.97	+0.08
62	8.5	0.59	+0.08
70	4.1	0.52	+0.08
80	6.5	0.45	+0.08
90	2.0	0.53	+0.12
91	3.3	0.77	+0.11
92	8.0	0.59	+0.08
93	4.5	0.78	+0.09
99	5.0	1.20	+0.12
100	9.0	0.92	+0.07
107	7.7	1.08	+0.07
111	8.7	0.52	+0.11
113	4.3	0.75	+0.09
114	3.8	1.32	+0.09
119	7.0	0.48	+0.08
123	7.0	1.66	+0.13
124	6.6	0.83	+0.13
133	6.0	0.56	+0.08
134	3.5	0.81	+0.12
135	3.8	0.62	+0.11
147	7.0	0.60	+0.08
150	7.0	1.39	+0.10
152	7.0	0.55	+0.07
153	6.2	0.57	+0.11
154	2.8	0.02	+0.10
160	3.7	0.82	+0.09
172	4.8	0.54	+0.08
182	6.1	1.29	+0.10

Number of stars 44
Average Mag. 6.1
" P. M. 0.″79
" Par. +0.″097

Par. : +0.″14 to +0.″20

Page	Mag.	P. M.	Par.
		″	″
11	7.5	0.45	+0.14
13–16	6.2	0.61	+0.14
19	6.0	1.37	+0.16
33–34	6.5	2.34	+0.14
88	3.7	0.74	+0.17
102	8.0	0.45	+0.17
103	5.5	0.63	+0.14
104	8.5	2.32	+0.17
109	5.0	0.65	+0.20
121	3.0	0.62	+0.17
125	5.7	1.06	+0.14
126–130	8.0	1.36	+0.17
149	5.5	0.58	+0.16
163	8.8	0.57	+0.16
169	7.0	0.84	+0.14
179	4.2	0.56	+0.14
181	8.7	1.39	+0.20

Number of stars 17
Average Mag. 6.3
" P. M. 0.″97
" Par. +0.″159

Table IV. Results arranged in order of Right Ascension.

R. A.: 0^h-3^h P. M.	Par.	3^h-6^h P. M.	Par.	6^h-9^h P. M.	Par.	9^h-12^h P. M.	Par.	12^h-15^h P. M.	Par.	15^h-18^h P. M.	Par.	18^h-21^h P. M.	Par.	21^h-24^h P. M.	Par.
Declinations above +30° (N)															
0.09	+0.13	0.02	+0.04	0.66	+0.03	0.55	+0.05	0.78	+0.09	0.75	+0.09	0.62	+0.11	0.11	+0.04
0.81	+0.01	1.25	+0.11	0.71	+0.01	0.10	+0.04	0.92	+0.07	0.82	+0.02	0.62	−0.03	0.15	−0.03
0.45	+0.02	0.00	−0.01	0.49	−0.01	0.76	−0.02	0.45	+0.17	0.56	+0.06	0.66	−0.06	0.61	+0.03
0.69	+0.07	1.38	+0.04	1.97	+0.08	0.48	+0.06	1.08	+0.07	0.60	+0.04	0.48	+0.05	0.18	−0.04
0.75	+0.03	0.64	+0.04	0.82	+0.04	0.10	+0.04			0.62	+0.17	0.24	+0.06	0.60	+0.05
0.82	+0.11	2.19	+0.04	0.89	−0.03	0.41	−0.02			0.48	+0.04	0.14	−0.01	0.67	+0.03
0.62	+0.05	0.73	+0.02	0.44	−0.05	0.58	+0.04			0.83	+0.13	0.47	+0.01	0.45	−0.02
0.55	+0.09	0.68	+0.12	0.69	−0.08	0.09	−0.09			1.06	+0.14	0.33	+0.05	0.60	−0.09
1.15	+0.12	0.84	+0.11	0.51	+0.03	0.74	+0.17			0.53	+0.04	0.57	+0.11	0.77	−0.00
0.60	+0.01	0.56	+0.02	0.52	+0.08					0.56	+0.08	0.02	+0.10		
1.01	+0.05	0.55	+0.13									0.48	−0.02		
		0.72	+0.07									0.19	+0.01		
		Vol. I										0.64	+0.05		
		0.44	+0.08									0.27	+0.00		
												0.82	+0.09		
												0.70	−0.02		
												Vol. I			
												0.34	+0.08		
												0.01	−0.01		
Average 0.76	+0.063	0.77	+0.062	0.77	+0.010	0.42	+0.030	0.81	+0.100	0.68	+0.081	0.42	+0.032	0.46	−0.003
Declinations below + 30° (S)															
0.45	+0.14	0.90	−0.00	0.57	+0.00	0.60	−0.02	0.59	+0.08	0.68	+0.04	0.96	+0.02	0.57	+0.16
0.79	+0.01	0.62	+0.07	0.82	+0.09	0.52	+0.00	0.52	−0.12	0.65	+0.20	0.66	+0.05	0.91	−0.13
0.61	+0.14	0.55	+0.06	0.52	+0.10	0.83	−0.06	0.68	+0.01	0.51	+0.02	0.03	−0.03	0.56	+0.02
0.63	+0.07	0.52	+0.01	0.59	+0.08	0.42	+0.04	0.51	−0.04	0.52	+0.11	0.03	−0.03	0.84	+0.14
1.37	+0.16	0.68	+0.05	1.19	+0.03	0.47	−0.13	0.72	−0.00	0.60	+0.03	0.60	+0.08	0.48	−0.03
0.47	+0.05	Vol. I		0.54	+0.06	0.45	+0.08	0.56	+0.02	1.32	+0.09	0.86	+0.03	0.54	+0 08
0.52	+0.09	0.20	+0.11	Vol. I		0.50	−0.00	1.20	+0.12	0.79	+0.00	0.58	+0.16	0.50	+0.01
0.57	+0.01	0.02	+0.02	1.23	+0.33	0.49	+0.04	0.58	−0.03	0.48	+0.08	1.39	+0.10	0.73	−0.05
0.73	+0.12			0.63	+0.06	0.46	+0.03	0.63	+0.14	1.46	+0.00	0.55	+0.07	0.48	+0.01
0.60	+0.02					0.75	−0.04	2.32	+0.17	1.66	+0.13	0.85	+0.05	0.56	+0.14
2.34	+0.14					0.53	+0.12	0.50	+0.03	1.36	+0.17	0.55	−0.13	1.39	+0.20
						0.77	+0.11	0.55	−0.02	0.58	−0.01	Vol. I		1.29	+0.10
						Vol. I		Vol. I		0.81	+0.12	0.65	+0.23		
						0.26	+0.02	2.29	+0.03						
Average 0.83	+0.086	0.50	+0.046	0.76	+0.094	0.54	+0.015	0.90	+0.030	0.88	+0.074	0.64	+0.050	0.74	+0.054
N–S	−0.023		+0.016		−0.084		+0.015		+0.070		+0.007		−0.018		−0.057
Mean 0.79	+0.074	0.67	+0.056	0.77	+0.047	0.49	+0.021	0.88	+0.046	0.79	+0.078	0.51	+0.039	0.62	+0.030
Number of stars	22		20		18		22		17		23		30		21
Average Mag.	7.1		5.5		6.2		6.2		6.4		6.4		5.4		6.3

Table V. Results arranged according to Stellar Spectra.

Type I.

Class A.

Page.	Mag.	P. M.	Par.
		″	″
31	6.5	0.60	+0.02
37–38	2.3	0.02	+0.04
48	6.5	0.68	+0.12
69	3.1	0.51	+0.03
90	2.0	0.53	+0.12
140	6 5	0.03	−0.03
151	5.9	0.33	+0.05
169	7.0	0.84	+0.14
177	7.3	0.67	+0.03
Vol. I.			
328	1.4	0.26	+0.02
"	0.4	0.34	+0.08
"	1 0	0.65	+0.23
"	1.5	0.01	−0.01

Number of stars 13
Average Mag. 4.0
" P. M. ″0.42
" Par. ″+0.065

Type II.

Class E.

Page.	Mag.	P. M.	Par.
		″	″
12	7.5	0.79	+0.01
49	5.2	0.52	+0.01
58	6.3	0.82	+0.09
59	7.0	0.52	+0.10
64	6.7	0.82	+0.04
72	7.0	0.52	+0.00
80	6.5	0.45	+0.08
106	6.5	0.55	−0.02
125	5.7	1.06	+0.14
149	5.5	0.58	+0.16
153	6.2	0.57	+0.11
182	6.1	1.29	+0.10

Number of stars 12
Average Mag. 6.4
" P. M. ″0.71
" Par. ″+0.068

Class G.

		″	″
29	6.1	0.62	+0.05
88	3.7	0.74	+0.17
91	3.3	0.77	+0.11
121	3.0	0.62	+0.17

Number of stars 4
Average Mag. 4.0
" P. M. ″0.69
" Par. ″+0.125

Class I.

		″	″
52	6.3	0.55	+0.13
60	6.5	0.49	−0.01
89	7.5	0.75	−0.04
134	3.5	0.81	+0.12
175	3.8	0.73	−0.05

Number of stars 5
Average Mag. 5.5
" P. M. ″0.67
" Par. ″+0.030

Class F.

Page.	Mag.	P. M.	Par.
		″	″
26	5.3	0.82	+0.11
27–28	5.3	0.73	+0.12
32	5.0	1.15	+0.12
39	4.3	1.25	+0.11
43	4.2	0.55	+0.06
50	4.9	0.84	+0.11
55	5.5	0.66	+0.03
70	4.1	0.52	+0.08
93	4.5	0.78	+0.09
99	5.0	1.20	+0.12
103	5.5	0.63	+0.14
105	4.6	0.50	+0.03
109	5.0	0.65	+0.20
113	4.3	0.75	+0.09
114	3.8	1.32	+0.09
115	5.7	0.82	+0.02
133	6.0	0.56	+0.08
135	3 8	0.62	+0.11
143	4.9	0.24	+0.06
144	5.5	0.14	−0.01
146	5.4	0.47	+0.01
157	6.2	0.19	+0.01
159	4 5	0.27	+0.00
170	5.5	0.18	−0.04
172	4.8	0.54	+0.08
173	5.0	0.50	+0.01
179	4.2	0.56	+0.14
183	6.3	0.77	−0.00
Vol. I.			
328	0.2	0.44	+0.08
"	0.6	1.23	+0.33

Number of stars 30
Average Mag. 4.7
" P. M. ″0.66
" Par. ″+0.079

Class L.

		″	″
165	4.1	0.11	+0.04

Class H.

Page	Mag.	P. M.	Par.
		″	″
11	7.5	0.45	+0.14
13–16	6.2	0.61	+0.14
19	6.0	1.37	+0.16
24	7.9	0.57	+0.01
33–34	6.5	2.34	+0.14
35	7.3	0.60	+0.01
68	6.0	0.54	+0.06
71	7.0	0.60	−0.02
73	7.5	0.55	+0.05
74	5.2	0.10	+0.04
75	5.5	0.76	−0.02
83	6.0	0.41	−0.02
87	6.0	0.09	−0.09
94	6.4	0.52	−0.12
97	6.8	0.72	−0.00
122	7.6	0.48	+0.04
131	6.5	0.53	+0.04
136	6.2	0.62	−0.03
137	5.5	0.76	+0.02
138	6.1	0.66	+0.05
142	7.0	0.48	+0.05
148	6.0	0.86	+0.03
166	5.0	0.15	−0.03
180	7.5	0.62	−0.09

Number of stars 24
Average Mag. 6.5
" P.M. ″0.65
" Par. ″+0.023

Class K.

		″	″
160	3.7	0.82	+0.09
178	3.5	0.45	−0.02
Vol. I.			
328	1.0	0.20	+0.11
"	1.2	0.63	+0.06
"	0.0	2.29	+0.03

Number of stars 5
Average Mag. 1.9
" P. M. ″0.88
" Par. ″+0.054

Type III.

Class M.

Page.	Mag.	P. M.	Par.
		″	″
81	3.1	0.10	+0.04
96	3.0	0.51	−0.04
Vol. I.			
328	0.8	0.02	+0.02

Number of stars 3
Average Mag. 2.1
" P. M. ″0.22
" Par. ″+0.007

Class Q.

		″	″
139	3.0	0.03	−0.02
154	2.8	0.01	+0.10

Number of stars 2
Average Mag. 2.9
" P. M. ″0.02
" Par. ″+0.040

Table I reveals, as was to be expected, a distinct interdependence of parallax and proper-motion, one feature of which may be specially noticed, viz., the uniformly positive and generally appreciable values of the group with proper-motions exceeding 1″.

The data of Table II point to a small but undoubted relation between parallax and magnitude, which, however, would be somewhat affected by a consideration of the slight progression in the values of the mean proper-motion of the several groups.

Table III emphasizes to our minds the connection between proper-motion and parallax, none of the negative parallaxes corresponding to proper-motions greater than 1″, and a marked progression being very apparent. This table may also serve to indicate the number of spurious parallaxes belonging to the work. If, according to NEWCOMB, we regard all the negative results as due to errors of observation and likewise an equal number of positive values to balance these, it would seem that all seventeen of the group with parallaxes between + 0″.14 and + 0″.20 are real, 38 of those from + 0″.07 to + 0″.13 and 35 of those under + 0″.06. Thus there are 90 stars of the entire list of 163, for which there is considerable presumption that the parallax values found are actual.

In Table IV the values N.–S. do not apparently present any considerable evidence of constant difference or regular progression. On the other hand the mean results from all the stars show an unmistakable sequence of pronounced character which is, however, again largely due to a similar sequence in the average proper-motions. The mean values for the groups combined into quadrants are:

R. A :	0^h to 6^h	6^h to 12^h	12^h to 18^h	18^h to 24^h
Proper-Motion :	0″.73	0″.62	0″.83	0″.55
Parallax :	0.065	0.033	0.064	0.035
Number of Stars :	42	40	40	51
Average Magnitude :	6.3	6.2	6.4	5.8

the variations in which are in fair accord with any reasonable deductions from Table I. It may be remarked that in general the stars of the first and third of these divisions were observed in opposite parallax maxima in winter and summer, and those in the second and fourth in spring and autumn. This naturally suggests some possibility of a temperature effect remaining uneliminated; we fail, however, to discover how this can be the case, and feel measurably confident that the relation shown in Table IV is one of actual reality.

From Table V we have the mean values:

	Type I.		Type II.	
	All Stars.	Rejecting ? Stars.	All Stars.	Rejecting ? Stars.
Magnitude :	4.0	3.5	5.3	5.4
Proper-Motion :	0″.42	0″.42	0″.67	0″.70
Parallax :	+0.065	+0.066	+0.058	+0.056
Number of Stars :	13	11	81	69

The exclusion of the doubtful spectra (marked?) affects very slightly the mean values for each type, and although the evidence for Type I is not very strong, there does not appear for

these stars, especially when the average motions are taken into consideration, the law deduced by KAPTEYN of larger parallaxes for Type II. It must be noticed that the classes in this Type II present divergences which might almost be considered assuredly real, notably the values for classes F and H, + 0″.079 and +0″.023 respectively, with sensibly equal average proper-motions.

As regards the possible proper-motions and parallaxes of the comparison stars and their influence on our results, we may state that an examination of all the star catalogues at our disposal has led to the following results:

Seven stars have an apparently well assured total proper-motion over 0″.20 but under 0″.30; these are:

Piazzi 2^h, 123, *b*	B. D. + 6°,405
ι Ursae Majoris, *a*	48,1693
Lalande 19821, *b* and 39 Leonis, *a*	24,2207
Lalande 24774, *a*	44,2264
Weisse 17^h, 322, *c*	1,3421
Groombridge 3215, *b*	41,3845
γ Piscium, *a*	1,4694

The following twelve stars appear to have a total proper-motion between 0″.10 and 0″.20, of which, however, six (marked ?) are somewhat doubtful:

Lalande 4141, *a* ?	B. D. +23°,297
ι Ursae Majoris, *b* ?	49,1801
μ Ursae Majoris, *b*	42,2123
τ Bootis, *a* ?	18,2766
Lalande 25372, *b* ?	15,2631
Lalande 27742, *a* ?	19,2929
39 Serpentis, *a*	14,2940
β Cygni, *a'*	27,3391
Lalande 40844, *a*	6,4736
Lalande 40844, *b*	6,4752
Lalande 45755, *a*	42,4607
λ Andromedae, *a* ?	45,4246

Of the remaining stars that we have been able to find in older catalogues, none have indications of a total motion amounting to 0″.10; the mean B. D. magnitude of all the comparison stars is 7.7, and as, according to KAPTEYN, the average proper-motion of a star of this magnitude would appear to be about 0″.05, the above list of larger motions does not seem to be more extended than might be expected. Hence we feel safe in considering that the mean parallax values as given in the groups of the preceding tables are all determined relative to comparison stars of normal proper-motion. To reduce these results to absolute parallaxes we should have to add 0″.008, the mean parallax of such comparison stars, according to the above authority.

But, as to the special cases just cited, the reduction to absolute parallax by KAPTEYN's Table G (Publications of the Astron. Laboratory at Groningen, No. 8,) for the stars of the

first list with comparison star motions exceeding 0″.20 would be from 0″.017 to 0″.021, and for those of the second list from 0″.012 to 0″.017. For ι Ursae majoris and Lalande 40844, which have both comparison stars with probable sensible motion, the reductions would be 0″.025 and 0″.020, respectively.

In conclusion, we give below for the various groups, except for Table III, the average total stellar velocity relative to the sun in km. per sec. found from the formula:

$$\text{velocity} = 6.04 \times \text{proper-motion} : \text{parallax},$$

and the luminosity relative to the sun which, if we adopt CERASKI's value for the sun's magnitude, is given by the expression:

$$\log.\ \text{luminosity} = -0.4\ \text{magnitude} - 2\ \log.\ \text{parallax}.$$

These data have been derived on the assumption of the above values for the parallax of the comparison stars and for values one half and one and a half times as large.

Classification.		Average Magnitude.	Average Parallax.	Parallax of Comparison Stars, π, (KAPTEYN.)	Total Velocity Relative to Sun with			Luminosity Relative to Sun with		
					½ π.	π.	1½ π.	½ π.	π.	1½ π.
			″	″	km.	km.	km.			
Proper-motion:	0.00 — 0.34	3.8	0.019	0.009	36	30	26	55	38	29
	0.42 — 0.54	6.3	0.032	0.010	80	70	63	2.2	1.7	1.4
	0.55 — 0.65	6.7	0.059	0.009	56	52	49	0.52	0.45	0.40
	0.66 — 0.96	6.5	0.039	0.008	108	99	91	1.2	1.0	0.9
	1.01 — 2.34	6.2	0.109	0.009	80	77	74	0.26	0.24	0.22
Magnitude:	0.0 — 1.5	0.8	0.095	0.008	37	36	34	49	45	42
	2.0 — 4.9	3.8	0.066	0.010	45	42	39	6.0	5.2	4.6
	5.0 — 6.2	5.6	0.056	0.008	63	59	56	1.6	1.4	1.2
	6.3 — 7.0	6.7	0.045	0.010	88	80	73	0.83	0.70	0.58
	7.1 — 7.9	7.6	0.017	0.008	196	164	142	2.0	1.5	1.1
	8.0 — 9.0	8.3	0.047	0.009	94	86	80	0.16	0.14	0.12
	h h									
R. A.:	0 — 6	6.3	0.065	0.009	63	59	56	0.63	0.55	0.49
	6 — 12	6.2	0.033	0.009	100	89	80	2.3	1.9	1.5
	12 — 18	6.4	0.064	0.009	73	69	65	0.46	0.40	0.35
	18 — 24	5.8	0.035	0.009	84	75	68	3.1	2.5	1.9
Spectrum:	Type I A	4.0	0.065	0.011	36	33	31	5.0	4.4	3.8
	" II E	6.4	0.068	0.009	59	55	52	0.52	0.46	0.42
	" " F	4.7	0.079	0.008	48	46	44	1.9	1.7	1.6
	" " H	6.5	0.023	0.009	143	123	108	3.3	2.5	1.9
	" " all	5.3	0.058	0.009	65	60	57	1.9	1.7	1.5

In this summary the well known fact of the greater luminosity of the brighter stars is clearly brought out. It would further appear that, however the parallactic motion be allowed for, the total stellar velocities for our list are considerably greater than that deduced by KAPTEYN for the Bradley stars; but this may not be surprising with stars for the most part of large proper-motion.

Transactions of the Astronomical Observatory of Yale University

RESEARCHES WITH THE HELIOMETER

PARALLAX INVESTIGATIONS ON 35 SELECTED STARS

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CONTENTS.

		Page
§ 1.	Introduction	213
2.	Method of Observation and Reduction	214
3.	Arcturus. Chase	216
4.	Arcturus. Smith	227
5.	Arcturus. Elkin	233
6.	Arcturus. Final Value	235
7.	61 Cygni. Chase	236
8.	Groombridge 1830. Smith	244
9.	Groombridge 1830. Chase	247
10.	Groombridge 1830. Final Value	254
11.	σ Draconis. Smith	254
12.	Lalande 21185. Chase	256
13.	Groombridge 34. Chase	259
14.	Second Magnitude Stars. Chase and Smith	262
15.	Second Magnitude Stars. Final Values	278
16.	Seven Repeated Stars. Chase and Smith	280
17.	Revision for Two Stars. Chase	294
18.	Thirteen Additional Stars. Smith	295
19.	Three Pleiades Stars. Smith	315
20.	Final Results	321
21.	General Conclusions	323

PARALLAX INVESTIGATIONS

ON THIRTY-FIVE SELECTED STARS.

§ 1. Introduction.

Before the completion of our Parallax Investigations on 163 Stars, mainly of large Proper Motion, published in 1906, we took up and have since prosecuted more exhaustive investigations on certain stars of special interest, the results of which are here presented. These stars may be divided into five classes:—

A. Stars with remarkably large proper motion, for which the parallax values already determined by other observers seemed somewhat uncertain, or which it seemed desirable to redetermine with a modern heliometer. These are Arcturus, 61 Cygni, 1830 Groombridge, σ Draconis, Lalande 21185, and 34 Groombridge.

B. Second magnitude stars which had not heretofore been tested by reliable methods. This list includes γ Andromedae, γ Orionis, α Geminorum, γ Leonis, ζ Ursae Majoris, and α Ophiuchi.

C. Certain stars of our previous work, which showed exceptionally large parallaxes, or gave negative results of appreciable size. These are Lalande 19896, 33 Virginis, 5 Serpentis, Weisse 17^h, 322, Weisse 20^h, 1454, Weisse 21^h, 97, and Lalande 46650.

D. Additional stars with large proper motion, all but two over $0''.4$, with a somewhat larger number of observations than in our previous survey.

E. Certain stars in the Pleiades, which might afford evidence as to the parallax of the group as a whole.

The work of the present contribution will be presented and discussed in the above order.

There is also given a new deduction of a value for Arcturus by Dr. Elkin from his earlier work with the correction of an error detected by him in one of his series, and also a corrected value for Lalande 43492, for which a clerical mistake of $0^R.100$ in one observation was found. Finally there is included also a new value for 54 Piscium, derived in accordance with the method hereafter described and adopted.

§ 2. Method of Observation and Reduction.

The methods of observation and reduction are identical with those followed and described on pp. 6–8 of this volume.

The only additional remarks necessary are: —

First, to call attention to the fact that on Oct. 30, 1907, it was discovered that the field lens of the eyepiece had worked loose, at which time it was immediately screwed home, causing a very marked change in the scale-value. Now, whether this working-loose had taken place suddenly or been of gradual development was uncertain and could not be definitely determined from the data in hand. It may be remarked that with the customary method of treatment, viz., reducing all the observations to the same standard of scale-value by the divergence of the sum of the measures on any particular night from the mean sum, this change could have no effect on the resulting value of the parallax and would only affect the values of x and z. But to render all the observations approximately homogeneous, Chase and Smith each determined from his different series the effect of the focal-change, and the evidence not being at all conclusive as to the rate of change, there was applied to all of the measures made prior to the date mentioned, or else to those made subsequently thereto, the mean effect for each observer. This was for Chase $\pm 0^{R}.140$ per 1000^{R}, and for Smith $\pm 0^{R}.100$ was adopted for the first and second periods respectively. All of the measures thus corrected are marked by an asterisk in the tables giving the data for each star. A tendency for the eyepiece to work loose has been detected since, but every effort has been made to keep it screwed tight.

Second, in the discussion of the latter part of the work in 1909 and 1910 another important consideration has to be noticed: —

On examining the reductions for the stars observed by Smith in January, 1909, Dr. Elkin detected what appeared to be a sudden break in the Corrected Differences between those observed before Jan. 13 and those observed after Jan. 17. During this period no observations were made as the Repsold driving clock was disconnected and a Warner and Swasey clock was being adapted to the Heliometer; the mechanical work of this adaptation being made by Smith himself.

This break will be apparent on inspecting the values for the absolute term of the equations of condition for the four stars then under observation and the mean values of the Corrected Differences a–b, which are as follows: —

	Corrected Difference, Distance a — Distance b			
	β Cassiopeiae	ϵ Cephei	B. D. + 58°, 2605	B. D. + 62°, 2244
	R	R	R	R
Before Jan. 13, 1909:	−22.299	−11.615	+36.081	+23.372
After Jan. 17, 1909:	−22.317	−11.649	+36.039	+23.357
Change:	− 0.018	− 0.034	− 0.042	− 0.015

While no plausible explanation of this discrepancy could be assigned, its reality in the above cases, at least, seems too evident to be ignored, and accordingly a different x has been assumed before and after the dates in question.

These four stars could be thus treated without further observations, but all of SMITH's other series, which were then in progress, were added to, so that this treatment became possible for them also.

For the immediate period of the supposed break, Dr. CHASE's series afford but small evidence on this point. His 1830 Groombridge *e* & *f* pair (Series III) was then under observation, but only one night's work, January 22, 1909, was following the crucial period, and this leads to a small positive value of the change in the Corrected Difference.

He also, however, has made it possible to investigate the question by adding epochs to his several series on 1830 Groombridge and 33 Virginis, the conclusions from which will appear in his discussion of those stars. It may be stated in advance that no such break appears from his discussion, so that its origin in SMITH's work must remain a matter of conjecture. The object of the change of clocks mentioned above was to remove slight tremors the Repsold clock at times produced, which was quite successfully attained. These tremors made observing more difficult, but there is no reason why they should affect the distance-differences with pairs of such fair symmetry, the precautions taken to equalize the images with screens and the symmetrical method of observation followed.

It might be remarked that if the absolute distances were considered, the discrepancy would appear to point to a different manner of observing Distance *b*, but no ground exists for this to be the case either.

We now proceed to give the data for each star in the form described on page 9 of this volume and to their discussion following the order outlined in the Introduction. As a conclusion of such discussion we give an adopted value of the parallax, which we consider to be the best possible to be derived from all the material secured. In combining the results from several series by the same observer we have used three methods: —

Method *a*. The individual results have been given equal weights, regardless of their apparent accuracy as shown by the solutions. This would tend to eliminate the peculiar conditions that might exist in each series. For CHASE no residual systematic error is indicated; the average probable error of one of his later parallax values as resulting from a solution is $\pm 0''.015$, and from the agreement of the parallax values of those stars with several series it is $\pm 0''.012$. For SMITH, however, considerable systematic error seems manifest, the values for a parallax probable error being $\pm 0''.017$ from the solutions and $\pm 0''.027$ from the interagreement of separate series. But it might be noticed that some of his stars, such as α Geminorum, γ Leonis, and particularly ζ Ursae Majoris offer difficulties to some extent. In this method we have considered the mean of the two, viz., $\pm 0''.014$ for CHASE and $\pm 0''.022$ for SMITH, as reasonable values to adopt for the probable error of a parallax result from one series. For series taken from our earlier survey the value $\pm 0''.037$ similarly derived has been adopted. For Arcturus, however, the prob-

able errors for this method have been computed for all of the observers directly from the divergence of their several series. These are ±0″.008 for CHASE, ±0″.024 for SMITH, and ±0″.029 for ELKIN.

Method β. The results have been taken with the weights furnished by the solutions, and using the average probable error of one observation, the proper factor being introduced in those series involving a single comparison star to reduce them to the same unit.

Method γ. The separate results have been given weights corresponding to their probable errors, found directly in the solutions.

It then seemed reasonable to take for the adopted values the mean of the results and of the probable errors derived by these three methods. This, it is true, allows for but a small effect of any systematic error, but we do not feel that the evidence of such error is so strong, except possibly for some of SMITH's more difficult series, as not to render this procedure legitimate.

In combining the results by different observers a similar plan has been adopted.

§ 3. ARCTURUS. CHASE.

The value for the parallax of Arcturus found by Dr. ELKIN in his Parallaxes of First Magnitude Stars, Vol. I. Transactions of the Yale Observatory, a value almost incredibly small for a star of its large proper motion and brightness, gave rise to the question whether some inherent quality in the star, such as color, or some personal peculiarity of eye or habit of observation had not been a factor in his investigation.

In discussing his results Dr. ELKIN pointed out that the color-effect could only diminish the already very small value obtained for the parallax. This in itself might almost be deemed sufficient evidence of the non-existence of any such effect. Furthermore the question of a possible systematic error due to star-color was quite thoroughly investigated by the writer in 1898–9 from quite a large series of measures on stars of various degrees of redness, these observations being made expressly for this purpose on both sides of the meridian, v. pp. 184–191, and its value even for the most highly colored star was found to be less than the average probable error of a parallax determination.

Nevertheless, for more conclusive and independent evidence, as regards Arcturus itself, at Dr. ELKIN's suggestion I took up in 1902 his two best series, Series I and II, securing a considerable number of measures on both sides of the meridian at the epoch of minimum parallactic displacement, and to test the other question of a possible peculiarity of eye or method, at the succeeding epoch of maximum displacement also.

For the former purpose a term $\Delta\beta$ with the factor (v. p. 184)

$$\tan z \cos (p-q)$$

was introduced into each of the equations of condition, which by theory should come out positive in sign if Arcturus is redder than the comparison stars.

A solution of the normals derived from these observations showed the value of $\Delta\beta$ to be practically insensible, it coming out $+0''.017$ and $-0''.027$ from Series I and II respectively. Naturally the weights of the results for parallax were quite small, only 18.4 and 19.0 respectively, and to strengthen this determination and eliminate the proper motion additional measures were made in 1905 at the epochs of maximum displacement.

For further evidence Mr. SMITH added in 1903–4 a large number of measures of ELKIN's Series V and VI, the latter according to the same plan. The disagreement of SMITH's and my parallax results with respect to each other, and likewise to ELKIN, led to additional observations in 1906–7, SMITH making on Series II an extended set and I one on Series VI. Finally, to further strengthen the weights for the parallax I secured in 1908 two sets of measures at the maximum epochs on Series I and II, from which an independent solution could be made if we assume the proper motion correction to be known.

For Series I and II the annual proper motion of each distance was calculated with a considerable degree of accuracy by a comparison of my measures with those of ELKIN, made in 1886.

Taking account of the second powers of the time and using NEWCOMB's value of the proper motion of Arcturus, viz.:—

$2''.2864$ in the direction $209° 5'$ for 1855.0,

the change in the distance per year due to the proper motion of Arcturus alone was calculated for the different dates to be as follows:—

		1886 R	1902 R	1908 R
Series I	For distance a_I:	−0.0297	−0.0283	−0.0276
Series I	For distance b_I:	+0.0999	+0.1002	+0.1008
Series II	For distance a_{II}:	−0.0730	−0.0717	−0.0712
Series II	For distance b_{II}:	+0.0781	+0.0791	+0.0793

With these values bringing ELKIN's mean measures up to 1902 and 1908 and adding together the four distances we have the following comparative results:—

		1902 R	1908 R
ELKIN	Sum:	1558.487	1558.972
CHASE	Sum:	1558.590	1559.204
		R	R
CHASE–ELKIN:		+0.103	+0.232
	R	R	R
Correction to CHASE per 1000:		−0.066	− 0.149

which serves to determine the scale-value correction to reduce all the measures to the same standard.

Correcting my measures by this quantity, I find the following differences between their means and those of ELKIN:—

	Interval	Series I Distance a_I R	Series I Distance δ_I R	Series II Distance a_{II} R	Series II Distance δ_{II} R
Chase-Elkin:	16.5 yrs	+0.045	−0.094	+0.041	+0.008
Chase-Elkin:	22.5 yrs	+0.063	−0.122	+0.049	+0.012

Hence the following additional annual corrections are shown:—

	Distance a_I R	Distance δ_I R	Distance a_{II} R	Distance δ_{II} R
1902:	+0.0027	−0.0057	+0.0025	+0.0005
1908:	+0.0028	−0.0054	+0.0022	+0.0005

which values are assumed to be due to the proper motion of the comparison stars. Adding these to the values already found due to the proper motion of Arcturus alone, I have the following total proper motion corrections:—

	Series I Distance a_I R	Series I Distance δ_I R	Series II Distance a_{II} R	Series II Distance δ_{II} R
For 1902 observations:	−0.0256	+0.0945	−0.0692	+0.0798
For 1908 observations:	−0.0248	+0.0954	−0.0690	+0.0798

which have been adopted in the reductions.

The reduced measures together with the usually given data are as follows:—

α Bootis	B. D. +19°, 2777	Mag. 1.0	R. A. 14h 9.1m	Decl. +19° 56′	Pos. Angle.
a_I	+20°, 2933	8.2	14 3.0	20 25	289°.9
b_I	+20°, 2968	8.4	14 14.9	20 2	85°.1

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance a_I. R	Distance δ_I. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1902 Apr. 12	17 16	3	38	426.617	397.380	+0.007	−0.026	823.978
13	16 41	2	37.5	.618	.378	.007	.026	.977
14	16 32	2–3	33	.612	.397	.007	.027	.989
15	17 22	2	34.5	.629	.385	.007	.027	.994
19	16 48	2	35.5	.621	.395	.008	.028	.996
23	16 41	3	48.5	.604	.398	.008	.029	.981
24	17 36	2	41	.623	.387	.008	.029	.989
1902 Apr. 30	11 7	3	55	426.628	397.397	+0.008	−0.031	824.002
May 1	11 58	2	51.5	.596	.393	.008	.031	823.966
5	11 32	1–2	59.5	.632	.403	.009	.032	824.012
8	11 44	2–3	55	.641	.394	.009	.033	.011
9	12 21	3	42	.621	.422	.009	.033	.019
13	11 54	2	55.5	.627	.402	.009	.034	.004
15	12 28	2	47.5	.634	.407	.009	.035	.015
1902 June 20	18 5	2	58.5	426.617	397.440	+0.012	−0.043	824.026
22	18 0	2–3	56	.631	.429	.012	.044	.028
23	17 0	2	52.5	.614	.426	.012	.045	.007
26	17 26	3	60	.629	.447	.012	.045	.043
27	17 39	2–3	58.5	.623	.421	.013	.046	.011
July 1	17 53	2–3	60	.639	.446	.013	.047	.051

α Bootis — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance a_1. R	Distance δ_1. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Nov. 28	9 44	3	24	426.617	397.455	+0.023	−0.086	824.009
	Dec. 3	10 25	2	35.5	.630	.451	.024	.087	.018
	5	10 32	2	6.5	.590	.459	.024	.088	823.985
	7	10 22	1–2	19	.624	.469	.024	.088	824.029
1903	Jan. 17	11 18	2	27	.586	.461	.027	.099	823.975
	22	10 56	1–2	25.5	.618	.452	.027	.101	.996
1905	Aug. 17	18 23	2–3	60.5	426.571	397.766	+0.092	−0.342	824.087
	18	17 52	3	59	.523	739	.093	.343	.012
	20	18 24	2–3	67.5	.582	.784	.093	.343	.116
	21	18 33	3–4	71	.583	.781	.093	.343	.114
	22	18 36	2	70	.575	.792	.093	.344	.116
	26	18 49	3–4	55	.581	.764	.093	.345	.093
					Assumed Annual Proper Motion and Mean Sum:		−0.0256	+0.0945	824.005

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. Solution A. R	Solution B. R	Final Solution. R
C.	29.237	+0.001	29.271	$+1.0\,x_1$	$+0.26\,y$	$+0.28\,z$	$-1.28\,\Delta\beta$ =	+0.009	+0.007	+0.005	+0.005
	.240	+ .001	.274	1.0	+0.23	0.28	0.99	+ .012	+ .010	+ .008	+ .008
	.215	+ .001	.250	1.0	+0.19	0.28	0.91	− .012	− .014	− .016	− .016
	.244	+ .000	.278	1.0	+0.16	0.28	1.37	+ .016	+ .014	+ .012	+ .012
	.226	+ .000	.262	1.0	+0.03	0.30	1.04	+ .000	− .001	− .003	− .002
	.206	+ .001	.244	1.0	−0.11	0.31	0.99	− .018	− .018	− .020	− .019
	.236	+ .001	.274	1.0	−0.14	0.31	1.52	+ .012	+ .013	+ .011	+ .011
C.	29.231	+0.000	29.270	$+1.0\,x_1$	$-0.34\,y$	$+0.33\,z$	$+1.62\,\Delta\beta$ =	+0.008	+0.006	+0.008	+0.008
	.203	+ .001	.243	1.0	0.37	0.33	1.11	− .019	− .020	− .019	− .019
	.229	− .000	.270	1.0	0.50	0.34	1.35	+ .008	+ .007	+ .009	+ .009
	.247	− .000	.289	1.0	0.59	0.35	1.24	+ .027	+ .027	+ .029	+ .029
	.199	− .000	.241	1.0	0.62	0.35	0.90	− .021	− .020	− .019	− .019
	.225	+ .000	.268	1.0	0.73	0.36	1.14	+ .006	+ .007	+ .009	+ .009
	.227	− .000	.271	1.0	0.78	0.37	0.85	+ .009	+ .011	+ .013	+ .012
C.	29.177	−0.001	29.231	$+1.0\,x_1$	$-1.64\,y$	$+0.46\,z$	$-1.89\,\Delta\beta$ =	−0.031	−0.019	−0.020	−0.021
	.202	− .001	.257	1.0	1.66	0.47	1.82	− .005	+ .006	+ .006	+ .005
	.188	− .000	.245	1.0	1.67	0.47	1.16	− .017	− .006	− .006	− .007
	.182	− .001	.238	1.0	1.71	0.48	1.41	− .024	− .014	− .013	− .014
	.202	− .000	.261	1.0	1.72	0.49	1.55	− .001	+ .010	+ .010	+ .009
	.193	− .002	.251	1.0	1.77	0.50	1.73	− .011	+ .001	+ .001	− .000
C.	29.162	−0.000	29.271	$+1.0\,x_1$	$+1.12\,y$	$+0.91\,z$	$+2.99\,\Delta\beta$ =	+0.009	−0.000	+0.002	+0.003
	.179	− .000	.290	1.0	1.23	0.92	2.16	+ .028	+ .019	+ .020	+ .022
	.131	+ .001	.244	1.0	1.28	0.93	2.05	− .018	− .027	− .026	− .025
	.155	− .001	.266	1.0	1.32	0.93	2.22	+ .004	− .005	− .004	− .003
	.125	+ .001	.252	1.0	1.86	1.04	1.50	− .010	− .021	− .022	− .020
	.166	+ .000	.294	1.0	1.87	1.06	1.75	+ .032	+ .021	+ .020	+ .022
C.	28.805	−0.003	29.236	$+1.0\,x_1$	$-1.77\,y$	$+3.62\,z$	$-2.12\,\Delta\beta$ =	−0.026	+0.005	+0.005	+0.005
	.784	− .000	.220	1.0	1.75	3.63	1.71	− .042	− .011	− .011	− .011
	.798	− .004	.230	1.0	1.72	3.63	2.14	− .032	− .001	− .001	− .001
	.802	− .004	.234	1.0	1.70	3.63	2.30	− .028	+ .003	+ .003	+ .003
	.783	− .004	.216	1.0	1.68	3.64	2.34	− .046	− .015	− .015	− .015
	.817	− .003	.252	1.0	1.60	3.65	2.58	− .010	+ .021	+ .020	+ .020

Assumed Mean Diff.: 29.262

α **Bootis** — *continued.*

Normals:

				R
+32.00 x_1	−15.02 y	+34.93 z	− 9.97 $\Delta\beta$	= −0.191
−15.02	+50.37	−34.71	+51.15	= +0.525
+34.93	−34.71	+87.62	−39.97	= −0.654
− 9.97	+51.15	−39.97	+92.84	= +0.632

$[nn] = 0.01363$

Solution A, with $\Delta\beta$:

	R	R	
x_1 =	+0.0039	±0.0025	Wt. 16.80
y =	+0.0062	±0.0023	18.99
z =	−0.0060	±0.0016	39.56
$\Delta\beta$ =	+0.0012	±0.0017	37.76

$[vv] = 0.00642$ Prob. Error 1 Eq. = ±″0.129

π = +″0.079 ±″0.029

Solution B, without $\Delta\beta$:

	R	R	
x_1 =	+0.0044	±0.0024	Wt. 18.03
y =	+0.0074	±0.0017	36.54
z =	−0.0063	±0.0016	41.75

$[vv] = 0.00648$ Prob. Error 1 Eq. = ±″0.128

π = +″0.094 ±″0.021

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance a_1. R	Distance δ_1. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Jan.	3	10	7	3	17.5	426.507	397.979	+0.000	−0.001	824.485
	9	11	22	2–3	15.5	.505	.945	.001	.002	.449
	10	10	41	2–3	18	.522	.978	.001	.002	.499
	14	10	28	2–3	20.5	.513	.985	.001	.004	.495
	16	11	13	1–2	15.5	.527	.980	.001	.004	.504
	16	11	50	2–3	15	.521	.970	.001	.004	.488
	25	11	30	1–2	19	.515	.963	.002	.006	.474
	27	11	29	1–2	17	.509	.948	.002	.007	.452
1908 June	16	16	54	3–4	55.5	426.511	398.032	+0.011	−0.044	824.510
	19	17	31	3–4	64.5	.527	.024	.012	.044	.519
	21	17	27	3–4	73	.527	.064	.012	.045	.558
	26	17	29	2	61.5	.522	.059	.012	.046	.547
	26	18	6	2	60.5	.519	.041	.012	.046	.526
	28	17	12	2	67	.493	.019	.012	.047	.477
	28	17	57	2	66.5	.513	.057	.012	.047	.535
July	3	17	21	2	72	.515	.042	.013	.048	.522
Assumed Annual Proper Motion and Mean Sum:								−0.0248	+0.0954	824.503

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R	Final Solution. R
C.	28.528	+0.001	28.530	+1.0 x_2	+1.78 y	+0.01 z =	−0.010	−0.022	−0.023
	.560	+ .002	.565	1.0	1.82	0.02	+ .025	+ .013	+ .012
	.544	+ .000	.547	1.0	1.83	0.02	+ .007	− .005	− .006
	.528	+ .000	.533	1.0	1.85	0.04	− .007	− .019	− .020
	.547	− .000	.552	1.0	1.86	0.04	+ .012	− .000	− .001
	.551	+ .000	.556	1.0	1.86	0.04	+ .016	+ .004	+ .003
	.552	+ .001	.561	1.0	1.85	0.07	+ .021	+ .009	+ .008
	.561	+ .002	.572	1.0	1.84	0.07	+ .032	+ .020	+ .019
C.	28.479	−0.000	28.534	+1.0 x_2	−1.60 y	+0.46 z =	−0.006	+0.003	+0.004
	.503	− .001	.558	1.0	1.63	0.47	+ .018	+ .027	+ .028
	.463	− .002	.518	1.0	1.65	0.47	− .022	− .013	− .012
	.463	− .002	.519	1.0	1.71	0.49	− .021	− .011	− .010
	.478	− .001	.535	1.0	1.71	0.49	− .005	+ .005	+ .005
	.474	+ .001	.534	1.0	1.73	0.49	− .006	+ .004	+ .005
	.456	− .001	.514	1.0	1.73	0.49	− .026	− .016	− .015
	.473	− .001	.533	1.0	1.80	0.50	− .007	+ .003	+ .004

Assumed Mean Difference: 28.540

α **Bootis** — *continued.*

				R			
Normals:	+16.00 x_2	+ 1.13 y	+4.17 z	= +0.022	*Solution:* x_2 =	+0.0009	±0.0024	Wt. 15.98
	+ 1.13	+49.98	−6.00	= +0.308	y =	+0.0061	±0.0013	49.90

$[nn] = 0.00474$ $[vv] = 0.00283$ Prob. Error 1 Eq. = ±″0.121

π = +″0.078 ±″0.017

Disregarding $\Delta\beta$ and assuming z in the 1908 series, where the accurate value of the proper motion was determined by a comparison with ELKIN's work in 1886, to be zero, adding the normals of the above two series and solving we get the following for final values: —

		R	R	
Final Solution:	x_1 =	+0.0043	±0.0023	Wt. 18.06
	x_2 =	+0.0009	±0.0024	15.99
	y =	+0.0066	±0.0011	86.46
	z =	−0.0065	±0.0014	45.91

$[nn] = 0.01837$ $[vv] = 0.00934$ Prob. Error 1 Eq. = ±″0.125

π = +″0.084 ±″0.013

α **Bootis**	**B. D. +19°, 2777**	**Mag. 1.0**	**R. A. 14h 9.1m**	**Decl. +19° 56′**	**Pos. Angle.**
a_{II}	+20°, 2934	8.3	14 3.4	20 3	275°.5
b_{II}	+19°, 2796	7.2	14 14.6	19 51	92°.9

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance a_{II}. R	Distance b_{II}. R	P. M. Corrections. R	R	Corrected Sum. R
1902 Apr. 12	17	53	3	37.5	374.320	360.252	+0.019	−0.022	734.569
13	17	20	3–4	37	.326	.250	.019	.022	.573
14	17	12	2–3	33.5	.317	.247	.019	.022	.561
15	16	38	2	37.5	.318	.258	.019	.022	.573
23	17	27	3	47.5	.316	.267	.021	.025	.579
23	18	19	3	47	.321	.260	.021	.025	.577
24	16	59	2	42	.308	.263	.022	.025	.568
1902 Apr. 30	12	4	3	53.5	374.323	360.275	+0.023	−0.026	734.595
May 1	11	25	2	53	.313	.269	.023	.026	.579
5	12	9	3	60	.325	.271	.024	.027	.593
8	12	18	3	53.5	.322	.277	.024	.027	.596
9	11	47	3	42	.327	.306	.024	.028	.629
13	12	25	2–3	55	.297	.289	.025	.029	.582
14	11	46	3	51	.317	.288	.025	.029	.601
15	11	54	2	48.5	.315	.276	.026	.030	.587
1902 June 20	18	35	2	58	374.343	360.312	+0.032	−0.037	734.650
22	17	18	2–3	57	.304	.282	.032	.037	.581
23	17	35	2	52	.335	.307	.033	.037	.638
27	17	1	2–3	59	.289	.270	.034	.039	.554
27	18	18	2–3	58	.313	.304	.034	.039	.612
July 1	17	19	2–3	62.5	.291	.306	.035	.040	.592

α **Bootis** — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance α_{II}. R	Distance δ_{II}. R	P. M. Corrections. R	R	Corrected Sum. R
1902	Nov. 28	10 26	3	23	374.271	360.299	+0.063	−0.073	734.560
	Dec. 3	9 41	2	36.5	.294	.315	.064	.074	.599
	5	9 52	2	8	.289	.280	.064	.074	.559
	7	9 45	1–2	19.5	.290	.312	.065	.074	.593
1903	Jan. 17	10 34	2	28	.261	.297	.072	.083	.547
	22	10 18	1–2	26	.271	.319	.074	.085	.579
1905	Aug. 17	18 56	2–3	59.5	374.105	360.574	+0.250	−0.289	734.640
	18	18 26	3	59	.099	.561	.251	.290	.621
	20	18 53	2–3	67	.093	.580	.251	.290	.634
	22	18 9	2	70	.125	.583	.252	.290	.670
	26	18 19	3–4	55.5	.109	.546	.253	.291	.617
							Assumed Annual Proper Motion and Mean Sum:	−0.0692	+0.0798	734.586

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Solution A. R	Residuals. Solution B. R	Final Solution. R
C.	14.068	+0.000	14.109	$+1.0\,x_1$	$+0.32\,y$	$+0.28\,z$	$-1.86\,\Delta\beta$	= +0.010	+0.000	+0.004	+0.006
	.076	+ .000	.117	1.0	+0.28	0.28	1.47	+ .018	+ .009	+ .012	+ .014
	.070	+ .000	.111	1.0	+0.25	0.28	1.38	+ .012	+ .004	+ .007	+ .008
	.060	+ .000	.101	1.0	+0.22	0.28	1.06	+ .002	− .005	− .003	− .001
	.049	+ .000	.095	1.0	−0.05	0.31	1.54	− .004	− .008	− .006	− .005
	.061	+ .000	.107	1.0	−0.05	0.31	2.23	+ .008	+ .002	+ .006	+ .006
	.045	+ .000	.092	1.0	−0.08	0.31	1.25	− .007	− .011	− .008	− .008
C.	14.048	−0.000	14.097	$+1.0\,x_1$	$-0.28\,y$	$+0.33\,z$	$+1.03\,\Delta\beta$	= −0.002	+0.001	−0.001	−0.002
	.044	+ .000	.093	1.0	0.31	0.33	1.40	− .006	− .002	− .005	− .005
	.054	− .000	.105	1.0	0.44	0.34	0.98	+ .006	+ .011	+ .009	+ .007
	.045	− .000	.096	1.0	0.54	0.34	0.91	− .003	+ .003	+ .001	− .001
	.021	− .001	.072	1.0	0.57	0.35	1.18	− .027	− .020	− .022	− .024
	.008	+ .000	.062	1.0	0.68	0.36	0.85	− .037	− .029	− .031	− .034
	.029	− .000	.083	1.0	0.71	0.36	1.17	− .016	− .007	− .010	− .012
	.039	− .000	.095	1.0	0.74	0.37	1.12	− .004	+ .005	+ .002	− .001
C.	14.031	−0.001	14.099	$+1.0\,x_1$	$-1.64\,y$	$+0.46\,z$	$-2.52\,\Delta\beta$	= +0.000	+0.016	+0.017	+0.011
	.022	+ .000	.091	1.0	1.66	0.47	1.45	− .008	+ .010	+ .009	+ .003
	.028	− .001	.097	1.0	1.68	0.47	1.64	− .002	+ .016	+ .016	+ .009
	.019	+ .001	.093	1.0	1.73	0.49	1.27	− .006	+ .013	+ .012	+ .006
	.009	− .000	.082	1.0	1.73	0.49	2.22	− .017	+ .000	+ .001	− .005
	13.985	− .000	.060	1.0	1.78	0.50	1.46	− .039	− .020	+ .020	− .027
C.	13.972	+0.000	14.108	$+1.0\,x_1$	$+1.08\,y$	$+0.91\,z$	$+2.14\,\Delta\beta$	= +0.009	−0.005	−0.006	+0.000
	.979	− .000	.117	1.0	1.20	0.92	2.95	+ .018	+ .004	+ .002	+ .009
	14.009	+ .001	.148	1.0	1.25	0.93	2.72	+ .049	+ .034	+ .032	+ .039
	13.978	− .000	.117	1.0	1.30	0.93	2.87	+ .018	+ .002	+ .001	+ .008
	.964	+ .001	.120	1.0	1.88	1.04	2.02	+ .021	− .003	− .003	+ .007
	.952	+ .000	.111	1.0	1.88	1.06	2.26	+ .012	− .012	− .012	− .002
C.	13.531	−0.001	14.069	$+1.0\,x_1$	$-1.81\,y$	$+3.62\,z$	$-2.97\,\Delta\beta$	= −0.030	−0.009	−0.008	−0.010
	.538	− .001	.078	1.0	1.80	3.63	2.36	− .021	+ .000	+ .000	− .001
	.513	− .001	.053	1.0	1.76	3.63	2.90	− .046	− .026	− .025	− .027
	.542	− .002	.082	1.0	1.73	3.64	2.09	− .017	+ .004	+ .004	+ .002
	.563	− .001	.106	1.0	1.66	3.65	2.24	+ .007	+ .027	+ .027	+ .026
	Assumed Mean Diff.:		14.099								

Normals:

				R
$+32.00\,x_1$	$-13.77\,y$	$+31.67\,z$	$-10.31\,\Delta\beta$	= −0.103
−13.77	+48.51	−29.58	+ 55.20	= +0.563
+31.67	−29.58	+74.61	− 36.54	= −0.323
−10.31	+55.20	−36.54	+117.19	= +0.577

$[nn] = 0.01259$

α **Bootis** — *continued.*

Solution A, with $\Delta\beta$:

	R		
x_1 = +0.0031	±0.0023	Wt.	17.73
y = +0.0136	±0.0022		19.48
z = −0.0010	±0.0016		36.28
$\Delta\beta$ = −0.0015	±0.0014		51.94

$[vv]$ = 0.00580 Prob. Error 1 Eq. = ±″0.123

π = +″0.172 ±″0.028

Solution B, without $\Delta\beta$:

	R	R	
x_1 = +0.0026	±0.0022	Wt.	18.52
y = +0.0119	±0.0016		36.70
z = −0.0007	±0.0016		37.29

$[vv]$ = 0.00592 Prob. Error 1 Eq. = ±″0.120

π = +″0.151 ±″0.020

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance α_{II}. R	Distance δ_{II}. R	P. M. Corrections. R	R	Corrected Sum. R
1908	Jan. 3	11	18	3	18	373.951	360.735	+0.000	−0.001	734.685
	9	10	38	2–3	16	.963	.744	.002	.002	.707
	10	11	31	2–3	17.5	.955	.729	.002	.002	.684
	14	11	10	2–3	20	.933	.731	.003	.003	.664
	14	11	48	2–3	19.5	.926	.738	.003	.003	.664
	16	10	37	1–2	16	.944	.751	.003	.003	.695
	25	12	8	1–2	18	.941	.741	.005	.005	.682
	27	10	45	3	18	.937	.730	.005	.006	.666
1908	June 16	17	46	3–4	55	373.914	360.813	+0.032	−0.037	734.722
	19	16	44	2–3	64.5	.914	.787	.032	.037	.696
	19	18	15	3–4	64.5	.934	.793	.032	.037	.722
	21	16	43	3–4	73	.923	.793	.033	.038	.711
	26	16	46	2	62	.911	.808	.034	.039	.714
	30	17	15	2–3	68	.937	.801	.034	.040	.732
	30	18	3	3–4	67	.950	.814	.034	.040	.758
	July 3	18	2	2	72	.928	.796	.035	.040	.719
	Assumed Annual Proper Motion and Mean Sum:							−0.0690	+0.0798	734.701

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R	Final Solution. R
C.	13.216	+0.000	13.217	+1.0 x_2	+1.78 y	+0.01 z =	+0.007	+0.005	−0.001
	.219	− .000	.223	1.0	1.83	0.02	+ .013	+ .010	+ .005
	.226	+ .000	.230	1.0	1.84	0.02	+ .020	+ .017	+ .012
	.202	+ .001	.209	1.0	1.86	0.04	− .001	− .004	− .009
	.188	+ .001	.195	1.0	1.86	0.04	− .015	− .018	− .023
	.193	+ .000	.199	1.0	1.87	0.04	− .011	− .014	− .019
	.200	+ .000	.210	1.0	1.87	0.07	+ .000	− .003	− .008
	.207	+ .001	.219	1.0	1.86	0.07	+ .009	+ .006	+ .001
C.	13.101	−0.000	13.170	+1.0 x_2	−1.58 y	+0.46 z =	−0.040	−0.028	−0.023
	.127	+ .000	.196	1.0	1.62	0.47	− .014	− .002	+ .004
	.141	− .000	.210	1.0	1.62	0.47	− .000	+ .012	+ .018
	.130	− .000	.201	1.0	1.65	0.47	− .009	+ .003	+ .009
	.103	− .000	.176	1.0	1.71	0.49	− .034	− .021	− .016
	.136	− .001	.209	1.0	1.76	0.50	− .001	+ .012	+ .018
	.136	− .001	.209	1.0	1.76	0.50	− .001	+ .012	+ .018
	.132	− .000	.207	1.0	1.80	0.50	− .003	+ .010	+ .016

Assumed Mean Difference: 13.210

Normals: +16.00 x_2 + 1.27 y +4.17 z = −0.080 (R)
+ 1.27 +50.11 −5.96 = +0.207

Solution: x_2 = −0.0053 ±0.0024 (R) Wt. 15.97
y = +0.0043 ±0.0013 (R) 50.01

$[nn]$ = 0.00409 $[vv]$ = 0.00278 Prob. Error 1 Eq. = ±″0.120

π = +″0.054 ±″0.017

α Bootis — *continued.*

Again disregarding ΔS and ε as in Series I, adding the normals of the two series, and solving we derive the following values:—

	R	R	
Final Solution: x_1 =	+0.0026	±0.0024	Wt. 18.54
x_2 =	−0.0056	±0.0025	15.08
y =	+0.0075	±0.0011	80.71
z =	−0.0024	±0.0016	40.52

$[nn] = 0.01668$ $[vv] = 0.00995$ Prob. Error 1 Eq. = ±0".128

π = +0".095 ±0".014

α Bootis	B. D. +19°, 2777	Mag. 1.0	R. A. 14h 9.1m	Decl. +19° 56′	Pos. Angle.
a_{VI}	+18°, 2848	7.6	14 7.4	18 46	198°.3
b_{VI}	+20°, 2954	7.0	14 9.8	20 48	12°.0

Date.	Sid. Time. h m	Def.	Temp. °	Distance a_{VI} R	Distance b_{VI} R	P. M. Corrections. R	R	Corrected Sum. R
1906 Apr. 16	11 33	3	45.5	342.000	257.962	−0.114	+0.114	599.962
16	12 12	3	45	.004	.944	.114	.114	.948
17	11 20	3–4	51.5	.014	.960	.114	.114	.974
17	11 56	3–4	52	341.993	.955	.114	.114	.948
18	11 8	2	58.5	342.009	.948	.114	.114	.957
18	11 43	2	58.5	.008	.949	.114	.114	.957
24	11 12	2–3	42.5	.002	.953	.110	.110	.955
24	11 41	2–3	41	.006	.940	.110	.110	.946
25	11 16	3	41	.005	.948	.110	.110	.953
25	11 52	3	40	.009	.960	.110	.110	.969
27	11 19	3	55	341.989	.964	.109	.109	.953
27	11 52	3	56	.995	.971	.109	.109	.966
28	11 32	2	50	342.005	.948	.109	.109	.953
28	12 7	2	49.5	341.997	.976	.109	.109	.973
May 4	11 33	3–4	51	.995	.971	.106	.106	.966
4	12 4	3–4	50.5	342.009	.968	.106	.106	.977
1906 Sept. 7	18 48	3–4	71.5	341.964	258.019	−0.051	+0.051	599.983
7	19 23	3–4	70	.981	.030	.051	.051	600.011
9	18 36	2–3	72	.961	.043	.050	.050	.004
9	19 8	2–3	71	.946	.026	.050	.050	599.972
15	18 54	3	57.5	.941	.047	.048	.048	.088
15	19 24	3	55.5	.965	.041	.048	.048	600.006
16	18 50	2–3	57	.933	.045	.046	.046	599.978
16	19 21	2–3	56	.949	.052	.046	.046	600.001
17	18 40	1–2	63.5	.925	.016	.046	.046	599.941
17	19 9	1–2	63	.914	.037	.046	.046	.951
18	18 41	3–4	72	.916	.015	.046	.046	.931
18	19 12	3–4	72	.929	.022	.046	.046	.951
19	18 44	3	77.5	.933	.032	.046	.046	.965
23	18 55	3–4	69	.930	.029	.045	.045	.959
24	19 6	3–4	54	.912	.032	.043	.043	.944
25	18 49	2–3	53.5	.928	.054	.043	.043	.982
25	19 16	2–3	53.5	.961	.044	.043	.043	600.005
27	18 56	3–4	64	.939	.037	.042	.042	599.976
28	19 12	2	59	.930	.046	.042	.042	.976
Oct. 4	19 11	3	60	.890	.023	.040	.040	.913
5	19 17	3–4	62.5	.949	.030	.038	.038	.979
Nov. 22	9 52	3–4	34.5	.869	.040	.018	.018	.909
26	9 34	2–3	39.5	.858	.025	.016	.016	.883
26	10 17	2–3	39.5	.863	.015	.016	.016	.878
Dec. 11	10 16	2–3	7.5	.870	.065	.010	.010	.044
11	10 55	2–3	5.5	.850	.051	.010	.010	.001
18	10 52	2–3	7.5	.840	.047	.000	.000	.803

α **Bootis** — *continued.*

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance α_{VI}. R	Distance δ_{VI}. R	P. M. Corrections. R	R	Corrected Sum. R
1907	Apr. 15	10	29	2	33.5	341.808	258.109	+0.045	−0.045	599.917
	15	11	6	2	33	.816	.097	.045	.045	.913
	17	10	40	3	36	.799	.104	.046	.046	.903
	17	11	15	3	36	.801	.086	.046	.046	.887
	18	10	50	3	35	.794	.089	.046	.046	.883
	18	11	22	3	34	.809	.083	.046	.046	.892
	19	10	50	3–4	32.5	.816	.096	.048	.048	.912
	21	10	52	2–3	41	.803	.096	.048	.048	.899
	21	11	21	2–3	39.5	.815	.081	.048	.048	.896
	24	10	49	3–4	46.5	.788	.103	.050	.050	.891
	24	11	24	3–4	45.5	.791	.090	.050	.050	.881
	May 5	10	57	3–4	42.5	.819	.108	.054	.054	.927
	5	11	31	3–4	42	.785	.090	.054	.054	.875
	11	11	29	3–4	40	.804	.112	.057	.057	.916
	13	11	53	3	50.5	.801	.101	.058	.058	.902
						Assumed Annual Proper Motion and Mean Sum:		−0.160	+0.160	599.946

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. Solution A. R	Solution B. R
C.	84.038	−0.002	83.808	$+1.0\,x$	$+1.05\,y$	$-0.71\,z$	$-0.75\,\Delta\beta$ =	−0.002	−0.014	−0.014
	.060	− .000	.832	1.0	1.05	0.71	0.68	+ .022	+ .010	+ .008
	.054	− .004	.822	1.0	1.06	0.71	0.78	+ .012	− .000	− .001
	.038	− .000	.810	1.0	1.06	0.71	0.71	+ .000	− .012	− .013
	.061	− .002	.831	1.0	1.06	0.71	0.81	+ .021	+ .009	+ .007
	.059	− .002	.829	1.0	1.06	0.71	0.73	+ .019	+ .007	+ .005
	.049	− .001	.828	1.0	1.07	0.69	0.80	+ .018	+ .006	+ .004
	066	+ .000	.846	1.0	1.07	0.69	0.73	+ .036	+ .024	+ .022
	.057	− .001	.836	1.0	1.07	0.69	0.79	+ .026	+ .014	+ .012
	.049	− .003	.826	1.0	1.07	0.69	0.71	+ .016	+ .004	+ .002
	.025	− .001	.806	1.0	1.07	0.68	0.78	− .004	− .016	− .016
	.024	− .003	.803	1.0	1.07	0.68	0.71	− .007	− .019	− .019
	.057	− .001	.838	1.0	1.07	0.68	0.75	+ .028	+ .016	+ .014
	.021	− .004	.799	1.0	1.07	0.68	0.69	− .011	− .023	− .023
	.024	− .003	.809	1.0	1.06	0.66	0.75	− .001	− .013	− .013
	.041	− .004	.825	1.0	1.06	0.66	0.69	+ .015	+ .003	+ .002
C.	83.945	−0.005	83.838	$+1.0\,x$	$-0.64\,y$	$-0.32\,z$	$-2.95\,\Delta\beta$ =	+0.028	+0.028	+0.029
	.951	− .009	.840	1.0	0.64	0.32	4.03	+ .030	+ .026	+ .031
	.918	− .008	.810	1.0	0.67	0.31	2.68	+ .000	+ .002	+ .002
	.920	− .004	.816	1.0	0.67	0.31	3.51	+ .006	+ .005	+ .008
	.894	− .006	.792	1.0	0.76	0.30	3.10	− .018	− .017	− .016
	.924	− .008	.820	1.0	0.76	0.30	4.07	+ .010	+ .008	+ .012
	.888	− .004	.792	1.0	0.77	0.29	2.99	− .018	− .016	+ .016
	.897	− .008	.797	1.0	0.77	0.29	3.96	− .013	− .015	− .011
	.909	+ .001	.818	1.0	0.78	0.29	2.76	+ .008	+ .010	+ .010
	.877	− .001	.784	1.0	0.78	0.29	3.54	− .026	− .027	− .024
	.901	+ .002	.811	1.0	0.79	0.29	2.78	+ .001	+ .003	+ .003
	.907	− .001	.814	1.0	0.79	0.29	3.63	+ .004	+ .003	+ .006
	.901	− .003	.806	1.0	0.80	0.29	2.84	− .004	− .002	− .002
	.901	− .002	.809	1.0	0.85	0.28	3.12	− .001	+ .001	+ .002
	.880	+ .000	.794	1.0	0.86	0.27	3.44	− .016	− .015	− .013
	.874	− .005	.783	1.0	0.87	0.27	2.99	− .027	− .024	− .024
	.917	− .008	.823	1.0	0.87	0.27	3.77	+ .013	+ .013	+ .016
	.902	− .004	.814	1.0	0.89	0.26	3.14	+ .004	+ .006	+ .007
	.884	− .004	.796	1.0	0.89	0.26	3.63	− .014	− .013	− .011
	.867	+ .005	.792	1.0	0.93	0.25	3.60	− .018	− .017	− .014
	.919	− .005	.838	1.0	0.94	0.24	3.80	+ .028	+ .029	+ .032
	.829	+ .005	.798	1.0	0.98	0.11	1.21	− .012	− .000	− .007

α Bootis — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.					Residuals. Solution A.	Residuals. Solution B.
	R	R	R					R	R	R
C.	83.833	+0.009	83.810	$+1.0\,x$	$-0.95\,y$	$-0.10\,z$	$-1.40\,\Delta\beta$	$=+0.000$	+0.011	+0.005
	.848	+ .010	.826	1.0	0.95	0.10	1.02	+ .016	+ .028	+ .021
	.814	+ .000	.794	1.0	0.78	0.06	1.03	− .016	− .005	− .011
	.799	+ .006	.785	1.0	0.78	0.06	0.84	− .025	− .013	− .020
	.799	+ .007	.794	1.0	0.66	0.04	0.86	− .016	− .005	− .012
C.	83.699	+0.004	83.793	$+1.0\,x$	$+1.04\,y$	$+0.28\,z$	$-0.96\,\Delta\beta$	$=-0.017$	−0.020	−0.019
	.719	+ .005	.814	1.0	1.04	0.28	0.81	+ .004	+ .001	+ .002
	.695	+ .006	.793	1.0	1.06	0.29	0.90	− .017	− .020	− .019
	.715	+ .008	.815	1.0	1.06	0.29	0.79	+ .005	+ .002	+ .003
	.705	+ .009	.806	1.0	1.06	0.29	0.86	− .004	− .007	− .006
	.726	+ .008	.826	1.0	1.06	0.29	0.77	+ .016	+ .013	+ .014
	.720	+ .005	.821	1.0	1.07	0.30	0.86	+ .011	+ .008	+ .009
	.707	+ .007	.810	1.0	1.07	0.30	0.86	+ .000	− .003	− .002
	.734	+ .007	.837	1.0	1.07	0.30	0.78	+ .027	+ .024	+ .025
	.685	+ .008	.793	1.0	1.07	0.31	0.87	− .017	− .020	− .019
	.701	+ .009	.810	1.0	1.07	0.31	0.77	+ .000	− .002	− .002
	.711	+ .003	.822	1.0	1.06	0.34	0.83	+ .012	+ .010	+ .010
	.695	+ .010	.813	1.0	1.06	0.34	0.75	+ .003	+ .001	+ .001
	.692	+ .004	.810	1.0	1.03	0.36	0.75	+ .000	− .002	− .001
	.700	+ .006	.822	1.0	1.03	0.36	0.71	+ .012	+ .011	+ .011

Assumed Mean Difference: 83.810

Normals:

				R	
+ 58.00 x	+11.05 y	−12.88 z	−100.82 $\Delta\beta$	= +0.147	
+ 11.05	+52.58	− 1.76	+ 36.07	= +0.305	
− 12.88	− 1.76	+10.79	+ 24.96	= −0.111	
−100.82	+36.07	+24.96	+265.37	= −0.077	$[nn] = 0.01493$

	R	R			R	R	
Solution A: x =	−0.0077	±0.0038	Wt. 6.76	*Solution B:* x =	−0.0008	±0.0016	Wt. 41.11
y =	+0.0096	±0.0024	16.48	y =	+0.0056	±0.0014	50.42
∎ =	−0.0095	±0.0035	7.81	z =	−0.0104	±0.0036	7.92
$\Delta\beta$ =	−0.0036	±0.0018	29.17				

$[vv] = 0.01180$ Prob. Error 1 Eq. = ±0.″126 $[vv] = 0.01218$ Prob. Error 1 Eq. = ±0.″127

$\pi = +0.''120 \quad \pm 0.''031$ $\pi = +0.''071 \quad \pm 0.''018$

The values of $\Delta\beta$ from the foregoing solutions brought together are:—

Series I:	$\Delta\beta = +0.''015$	±0.″021	Wt. 37.8
" II:	$\Delta\beta = -0.019$	±0.018	51.9
" VI:	$\Delta\beta = -0.046$	±0.023	29.2

from which the weighted mean comes out

$$\Delta\beta = -0.''016 \quad \pm 0.''012$$

The color-effect is thus seen not only to be very small for me, but negative in sign, and hence its reality is very questionable. The adoption of the solutions made without the assumption of such a term is therefore justified.

My three results for the parallax are thus:—

C. Series I:	$\pi = +0.''084$	±0.″013	Wt. 86.5	Prob. Error 1 Obs.	±0.″125	48 Obs.
C. " II:	$\pi = +0.095$	±0.014	86.7		±0.128	48
C. " VI:	$\pi = +0.071$	±0.018	50.4		±0.127	58

These values combined in the manner described in § 2 on Methods of Observation and Reduction pp. 215–16 give:—

$$\begin{array}{lll} \text{Method } \alpha: & \pi = +0''.083 & \pm 0''.0047 \\ \text{“ } \beta: & \pi = +0''.086 & \pm 0''.0085 \\ \text{“ } \gamma: & \pi = +0''.085 & \pm 0''.0084 \end{array}$$

the mean of which is the adopted value:—

$$\pi = +0''.085 \quad \pm 0''.007$$

It might be noted that the smallness of the probable error by Method α shows there to be no evidence of systematic error.

§ 4. Arcturus. Smith.

The values found by Dr. Chase from the earlier part of his series being so considerably different from Dr. Elkin's results, it was thought highly advisable to add the evidence of a third observer, and accordingly I took up in 1903 two other pairs, Elkin's Series VI and V. The former of these pairs admitted of easily securing evidence of the existence of a possible color-effect and enough epochs were added in 1906–7 to effectually eliminate the proper motion term.

My results from these pairs still coming out sensibly smaller than Chase's led to my taking up later, in 1906, the one of his series, Series II, which gave the largest value in his first reduction. This was carried through in one year.

The observational data are as follows:—

α Bootis	B. D. +19°, 2777	Mag. 1.0	R. A. $14^h\ 9.0^m$	Decl. +19° 56′	Pos. Angle.
a_{VI}	+18°, 2848	7.6	14 7.4	18 46	198°.3
b_{VI}	+20°, 2954	7.0	14 9.8	20 48	12°.0

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance a_{VI}. R	Distance b_{VI}. R	P. M. Corrections. R	R	Corrected Sum. R
1903 Apr.	19	11	4	1–2	48	342.467	257.443	+0.049	−0.049	599.910
	19	11	29	1–2	47	.460	.454	.049	.049	.914
	21	9	52	3	49	.445	.440	.049	.049	.885
	21	10	20	3	48	.468	.467	.049	.049	.935
	27	10	56	3–4	50	.494	.461	.052	.052	.955
	28	10	19	3	62	.461	.457	.052	.052	.918
	28	10	43	3	62	.461	.441	.052	.052	.902
	29	10	25	3	74	.492	.459	.054	.054	.951
	29	10	55	3	73	.485	.479	.054	.054	.964
	30	10	17	3–4	65	.490	.447	.054	.054	.937
	30	10	46	3–4	64	.496	.467	.054	.054	.963
May	7	11	2	3	53	.477	.450	.057	.057	.927
	8	11	1	3	62	.461	.458	.057	.057	.919

α **Bootis** — *continued.*

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance a_{VI}. R	Distance δ_{VI}. R	P. M. Corrections. R	R	Corrected Sum. R
1903 May	8	17	43	3	52	342.470	257.470	+0.057	−0.057	599.940
	8	18	14	3	50	.456	.466	.057	.057	.922
	9	17	52	2	46	.465	.453	.057	.057	.918
	9	18	17	2	46	.459	.471	.057	.057	.930
	10	17	58	3	44	.489	.473	.059	.058	.963
	10	18	27	3	43	.452	.466	.059	.058	.919
	11	17	40	1–2	46	.442	.462	.059	.058	.905
	11	18	7	1–2	46	.450	.464	.059	.058	.915
	17	17	41	1–2	50	.460	.464	.060	.060	.924
1903 Sept.	12	19	4	3–4	73	342.454	257.561	+0.114	−0.114	600.015
	14	18	42	3	74	.448	.554	.114	.114	.002
	15	18	40	3	72	.423	.525	.116	.115	599.949
	21	18	46	3–4	59	.402	.543	.118	.117	.946
	21	19	14	3–4	59	.418	.554	.118	.117	.973
	22	18	59	3	68	.414	.538	.119	.119	.952
	24	19	9	4	54	.426	.523	.119	.119	.949
	25	19	10	1–2	54	.420	.545	.119	.119	.965
	26	19	13	2	61	.437	.546	.121	.120	.984
	28	19	19	2–3	52	.420	.535	.121	.120	.956
	29	19	22	3	49	.426	.551	.121	.120	.978
	30	19	14	2	57	.409	.526	.122	.122	.935
1903 Nov.	20	9	37	3	20	342.368	257.543	+0.145	−0.145	599.911
	25	9	42	3–4	14	.363	.528	.147	.146	.892
	25	10	6	3–4	14	.364	.543	.147	.146	.908
	26	9	48	3	13	.374	.550	.147	.146	.925
	26	10	11	3	13	.368	.564	.147	.146	.933
Dec.	7	10	28	2	27	.355	.544	.152	.151	.900
	7	10	52	2	26	.343	.545	.152	.151	.889
	10	10	18	3	24	.366	.587	.154	.153	.954
	10	10	43	3	23	.371	.571	.154	.153	.943
	11	9	57	3	20	.354	.563	.154	.153	.918
	16	10	28	3	15	.393	.559	.157	.156	.953
	16	10	52	3	14	.370	.567	.157	.156	.938
1904 July	29	17	50	3	67	342.275	257.664	+0.259	−0.256	599.942
	29	18	15	3	67	.282	.666	.259	.256	.951
Aug.	9	18	40	3–4	60	.283	.694	.263	.261	.979
	9	19	9	3–4	60	.296	.697	.263	.261	.995
	15	18	43	3–4	70	.252	.687	.267	.265	.941
	15	19	8	3–4	70	.274	.685	.267	.265	.961
	18	18	32	3	63	.266	.680	.267	.265	.948
	18	18	55	3	64	.258	.690	.267	.265	.950
1907 Mar.	20	10	39	3	29.5	341.799	258.077	+0.684	−0.679	599.881
	20	11	9	3	28.5	.798	.079	.684	.679	.882
	25	10	25	3	30	.785	.080	.685	.681	.869
	25	10	47	3	29.5	.791	.074	.685	.681	.869
Apr.	3	10	21	3–4	36.5	.801	.072	.688	.684	.877
	3	10	42	3–4	36.5	.795	.068	.688	.684	.867
	11	10	1	3	36.5	.779	.075	.693	.689	.858
	11	10	22	3	36.5	.776	.078	.693	.689	.858
							Assumed Annual Proper Motion and Mean Sum:	−0.163	+0.162	599.939

α **Bootis** — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.					Residuals. Solution A.	Residuals. Solution B.
	R	R	R					R	R	R
S.	85.024	+0.004	85.126	+1.0 x	+1.06 y	+0.30 z	−0.82 $\Delta\beta$ =	+0.015	+0.005	+0.006
	.006	+ .004	.108	1.0	1.06	0.30	0.75	− .003	− .013	− .012
	.005	+ .008	.111	1.0	1.06	0.30	1.21	− .000	− .009	− .009
	.001	+ .001	.100	1.0	1.06	0.30	1.01	− .011	− .020	− .020
	.033	− .002	.135	1.0	1.08	0.32	0.85	+ .024	+ .014	+ .015
	.004	+ .003	.111	1.0	1.08	0.32	1.02	+ .000	− .00	− .009
	.020	+ .005	.129	1.0	1.08	0.32	0.89	+ .018	+ .008	+ .009
	.033	− .002	.139	1.0	1.08	0.33	0.98	+ .028	+ .019	+ .019
	.006	− .004	.110	1.0	1.08	0.33	0.85	− .001	− .011	− .010
	.043	− .000	.151	1.0	1.08	0.33	1.02	+ .040	+ .031	+ .031
	.029	− .003	.134	1.0	1.08	0.33	0.87	+ .023	+ .013	+ .014
	.027	+ .002	.143	1.0	1.05	0.35	0.82	+ .032	+ .023	+ .023
	.003	+ .003	.120	1.0	1.04	0.35	0.82	+ .009	− .000	+ .000
S.	85.000	−0.000	85.114	+1.0 x	+1.04 y	+0.35 z	−1.87 $\Delta\beta$ =	+0.003	−0.005	−0.006
	84.990	+ .002	.106	1.0	1.04	0.35	2.30	− .005	− .013	− .014
	85.012	+ .003	.129	1.0	1.04	0.35	1.98	+ .018	+ .010	+ .009
	.088	+ .001	.103	1.0	1.04	0.35	2.35	− .008	− .015	− .017
	.016	− .003	.130	1.0	1.04	0.36	2.06	+ .019	+ .011	+ .010
	84.986	+ .003	.106	1.0	1.04	0.36	2.51	− .005	− .012	− .014
	.980	+ .005	.102	1.0	1.04	0.36	1.84	− .009	− .017	− .018
	.986	+ .003	.106	1.0	1.04	0.36	2.19	− .005	− .013	− .014
	.996	+ .002	.118	1.0	1.02	0.37	1.85	+ .007	− .001	− .002
S.	84.893	−0.011	85.110	+1.0 x	−0.71 y	+0.70 z	−3.38 $\Delta\beta$ =	−0.001	−0.005	−0.006
	.894	− .009	.113	1.0	0.74	0.70	2.80	+ .002	− .002	− .003
	.898	− .001	.128	1.0	0.76	0.71	2.76	+ .017	+ .013	+ .012
	.859	− .001	.093	1.0	0.82	0.72	2.89	− .018	− .022	− .023
	.864	− .005	.094	1.0	0.82	0.72	3.70	− .017	− .020	− .022
	.876	− .002	.112	1.0	0.84	0.73	3.22	+ .001	− .003	− .004
	.903	− .001	.140	1.0	0.86	0.73	3.54	+ .029	+ .026	+ .024
	.875	− .004	.109	1.0	0.87	0.73	3.57	− .002	− .005	− .007
	.891	− .006	.126	1.0	0.88	0.74	3.67	+ .015	+ .012	+ .010
	.885	− .002	.124	1.0	0.89	0.74	3.88	+ .013	+ .010	+ .008
	.875	− .004	.112	1.0	0.90	0.74	4.00	+ .001	− .002	− .004
	.883	+ .001	.128	1.0	0.90	0.75	3.70	+ .017	+ .014	+ .012
S.	84.825	+0.004	85.119	+1.0 x	−0.97 y	+0.89 z	−1.36 $\Delta\beta$ =	+0.008	+0.003	+0.004
	.835	+ .007	.135	1.0	0.94	0.90	1.31	+ .024	+ .019	+ .020
	.821	+ .004	.118	1.0	0.94	0.90	1.10	+ .007	+ .002	+ .003
	.824	+ .002	.119	1.0	0.93	0.90	1.25	+ .008	+ .003	+ .004
	.804	+ .001	.098	1.0	0.93	0.90	1.06	− .013	− .018	− .017
	.811	+ .005	.119	1.0	0.82	0.93	0.97	+ .008	+ .003	+ .004
	.798	+ .007	.108	1.0	0.82	0.93	0.86	− .003	− .008	− .007
	.779	− .002	.084	1.0	0.78	0.94	1.02	− .027	− .032	− .031
	.800	− .001	.106	1.0	0.78	0.94	0.89	− .005	− .010	− .009
	.791	+ .003	.101	1.0	0.77	0.94	1.17	− .010	− .015	− .014
	.834	− .002	.145	1.0	0.70	0.96	0.97	+ .034	+ .029	+ .030
	.803	+ .000	.116	1.0	0.70	0.96	0.86	+ .005	+ .000	+ .001
S.	84.611	+0.000	85.126	+1.0 x	+0.02 y	+1.58 z	−1.96 $\Delta\beta$ =	+0.015	+0.015	+0.015
	.616	− .002	.129	1.0	0.02	1.58	2.31	+ .018	+ .018	+ .018
	.589	− .006	.107	1.0	−0.19	1.61	2.76	− .004	− .003	− .004
	.599	− .008	.115	1.0	0.19	1.61	3.54	+ .004	+ .006	+ .004
	.565	− .000	.097	1.0	0.28	1.63	2.82	− .014	− .013	− .014
	.589	− .003	.118	1.0	0.28	1.63	3.51	+ .007	+ .009	+ .007
	.586	− .001	.117	1.0	0.33	1.63	2.61	+ .006	+ .007	+ .006
	.568	− .002	.098	1.0	0.33	1.63	3.12	− .013	− .012	− .013

α Bootis — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.					Residuals. Solution A.	Solution B.
	R	R	R					R	R	R
S.	83.722	+0.008	85.093	+1.0 x	+0.81 y	+4.22 z	−0.91 $\Delta\beta$ =	−0.018	−0.005	−0.003
	.719	+ .008	.090	1.0	0.81	4.22	0.80	− .021	− .008	− .006
	.705	+ .010	.081	1.0	0.87	4.23	0.98	− .030	− .017	− .015
	.717	+ .010	.093	1.0	0.87	4.23	0.87	− .018	− .005	− .003
	.729	+ .009	.110	1.0	0.95	4.25	1.00	− .001	+ .012	+ .014
	.727	+ .010	.109	1.0	0.95	4.25	0.89	− .002	+ .011	+ .013
	.704	+ .011	.097	1.0	1.00	4.28	1.14	− .014	− .001	+ .001
	.698	+ .011	.091	1.0	1.00	4.28	1.00	− .020	− .007	− .005

Assumed Mean Diff.: 85.111

Normals:

				R
+ 62.00 x	+ 8.86 y	+ 74.05 z	−115.01 $\Delta\beta$ =	+0.177
+ 8.86	+48.57	+ 19.54	+ 10.89 =	+0.016
+ 74.05	+19.54	+184.03	−121.05 =	−0.358
−115.01	+10.89	−121.05	+281.67 =	−0.345

$[nn]$ = 0.01526

Solution A:

	R	R	
x =	+0.0121	±0.0032	Wt. 8.7
y =	+0.0004	±0.0016	36.3
z =	−0.0062	±0.0010	91.5
$\Delta\beta$ =	+0.0011	±0.0013	51.2

$[vv]$ = 0.01126 Prob. Error 1 Eq. = ±0.″120

π = +0.″005 ±0.″020

Solution B:

	R	R	
x =	+0.0100	±0.0017	Wt. 32.1
y =	+0.0009	±0.0014	46.5
z =	−0.0060	±0.0010	95.6

$[vv]$ = 0.01142 Prob. Error 1 Eq. = ±0.″119

π = +0.″011 ±0.″017

It is thus clearly evident that also for me the color-effect is insensible for Arcturus and these stars, and the parallax value from *Solution B* may be considered the outcome of this series.

α Bootis B. D. +19°, 2777 Mag. 1.0 R. A. 14h 9.0m Decl. +19° 56′ Pos. Angle.

a_V	+20°, 2942	8.5	14 5.4 20 29 303°.3
b_V	+19°, 2787	8.8	14 11.3 19 20 139°.4

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance a_V. R	Distance δ_V. R	P. M. Corrections. R	R	Corrected Sum. R
1903	July	7	17	43	1–2	71	288.375	222.389	−0.008	+0.033	510.789
		7	18	11	1–2	71	366	397	.008	.033	.788
		8	17	40	1–2	75	.365	.391	.008	.033	.781
		8	18	6	1–2	75	.381	.387	.008	.033	.793
		9	17	50	2	78	.360	.391	.008	.033	.776
		9	18	17	2	78	.373	.407	.008	.033	.805
		10	7	37	2	78	.374	385	.008	33	.784
		15	17	30	2	58	.348	.391	009	.034	.764
		16	17	35	2	64	.371	.392	.009	.034	.788
	Aug.	7	17	57	3	(0	.380	.374	.009	.038	.783
1904	Feb.	18	10	27	2	16	288.386	222.340	−0.018	+0.071	510.779
		19	9	55	2	19	.423	.342	.018	.07	.818
		20	11	22	2	17	.376	.342	.018	.071	.771
		21	10	8	2	29	.375	.347	.018	.071	.775
		22	11	28	3	28	.409	.332	.018	071	.794
		23	10	38	3	26	.351	.329	.018	.072	.734
		25	11	7	2	10	.365	.322	.018	.072	.741
		26	10	35	2–3	15	.434	.375	.018	.073	.864
	Mar.	4	10	8	3–4	13	.358	.330	.019	.074	.743
		5	11	32	3	9	.376	.331	.019	.074	.762

α Bootis — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance a_v. R	Distance δ_v. R	P. M. Corrections. R	R	Corrected Sum. R
1905	Dec. 27	10 33	3–4	27	288.426	222.191	−0.048	+0.189	510.758
1906	Jan. 5	10 53	3	32	.425	.196	.048	.190	.763
	6	10 17	3–4	26	.391	.208	.048	.190	.741
	9	10 22	3	5	.408	.222	.048	.190	.772
	31	10 26	3	35	.419	.213	.049	.194	.777
	Feb. 1	10 56	3	32	.427	.217	.049	.195	.790
1906	July 25	17 26	2	67.5	288.399	222.173	−0.057	+0.224	510.739
	Aug. 9	17 37	3	69.5	.404	.189	.058	.226	.761
	13	18 17	3	64.5	.409	.164	.058	.227	.742
	Sept. 1	18 41	3	59.5	.416	.165	.059	.231	.753
	3	18 39	3	71	.405	.170	.059	.231	.747
							Assumed Annual Proper Motion and Mean Sum:	+0.016	−0.063	510.778

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	65.986	−0.001	65.944	+1.0 x	−1.92 y	+0.52 z	−0.42 $\Delta\beta$ =	−0.006	+0.009
	.969	− .001	.927	1.0	1.92	0.52	0.56	− .023	− .008
	.974	− .000	.933	1.0	1.92	0.52	0.41	− .017	− .002
	.994	− .003	.950	1.0	1.92	0.52	0.53	+ .000	+ .015
	.969	+ .000	.928	1.0	1.92	0.52	0.45	− .022	− .007
	.966	− .004	.921	1.0	1.92	0.52	0.59	− .029	− .013
	.989	− .001	.947	1.0	1.92	0.52	0.40	− .003	+ .012
	.957	+ .002	.916	1.0	1.90	0.54	0.37	− .034	− .019
	.979	− .001	.935	1.0	1.90	0.54	0.39	− .015	+ .000
	66.006	− .001	.958	1.0	1.63	0.60	0.49	+ .008	+ .021
S.	66.046	−0.000	65.957	+1.0 x	+1.28 y	+1.13 z	+2.52 $\Delta\beta$ =	+0.007	−0.001
	.081	− .004	.988	1.0	1.26	1.14	3.15	+ .038	+ .030
	.034	+ .001	.946	1.0	1.23	1.14	1.78	− .004	− .012
	.028	+ .000	.939	1.0	1.20	1.14	2.87	− .011	− .019
	.077	− .002	.986	1.0	1.17	1.14	1.71	+ .036	+ .028
	.022	+ .006	.938	1.0	1.14	1.15	2.35	− .012	− .019
	.043	+ .005	.958	1.0	1.08	1.15	1.95	+ .008	+ .001
	.059	− .011	.957	1.0	1.05	1.16	2.39	+ .007	+ .000
	.028	+ .004	.939	1.0	0.86	1.18	2.87	− .011	− .017
	.045	+ .002	.954	1.0	0.84	1.18	1.67	+ .004	− .002
S.	66.235	+0.003	66.001	+1.0 x	+1.85 y	+2.99 z	+2.42 $\Delta\beta$ =	+0.051	+0.031
	.229	+ .002	65.993	1.0	1.85	3.01	2.13	+ .043	+ .023
	.183	+ .005	.950	1.0	1.85	3.02	2.70	+ .000	− .020
	.186	+ .001	.949	1.0	1.85	3.02	2.61	− .001	− .021
	.206	+ .000	.963	1.0	1.66	3.08	2.54	+ .013	− .006
	.210	− .002	.964	1.0	1 64	3.09	2.09	+ .014	− .004
S.	66.226	+0.005	65.950	+1.0 x	−1.82 y	+3.56 z	−0.35 $\Delta\beta$ =	+0.000	+0.001
	.215	+ .002	.933	1.0	1.59	3.60	0.40	− .017	− .018
	.245	+ .004	.964	1.0	1.53	3.62	0.58	+ .014	+ .013
	.251	+ .003	.964	1.0	1.05	3.67	0.70	+ .014	+ .010
	.235	+ .004	.949	1.0	1.00	3.67	0.70	− .001	− .006

Assumed Mean Difference: 65.950

Normals. *Solution.*

			R	R	R	
+31.00 x	− 4.05 y	+ 53.16 z	+30.41 $\Delta\beta$ = +0.051	x = −0.0047	±0.0035	Wt. 9.6
− 4.05	+77.69	+ 9.94	+64.17 = +0.559	y = +0.0064	±0.0013 −0.92 $\Delta\beta$	70.9
+53.16	+ 9.94	+137.03	+58.35 = +0.385	z = +0.0043	±0.0017	42.1

$[nn]$ = 0.01245 $[vv]$ = 0.00751 Prob. Error 1 Eq. = ±″0.140

π = +″0.081 ±″0.017

α Bootis	B. D. $+19°$, 2777	Mag. 1.0	R. A. $14^h\ 9.1^m$	Decl. $+19°\ 56'$	Pos. Angle.
a_{II}	$+20°$, 2934	8.3	14 3.4	20 3	$275°.7$
b_{II}	$+19°$, 2796	7.2	14 14.6	19 51	$92°.9$

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance a_{II}. R	Distance δ_{II}. R	P. M. Corrections. R	R	Corrected Sum. R
1906 Feb. 24	11 1	3	29.5	374.080	360.590	−0.057	+0.057	734.670
Mar. 1	10 10	3	24.5	.060	.572	.056	.056	632
1	10 40	3	24	.058	.575	.056	.056	.633
2	11 4	2–3	24.5	.063	.568	.056	.056	.631
5	10 29	3–4	26	.071	.561	.055	.055	.632
5	10 57	3–4	25.5	.063	.573	.055	.055	.636
6	10 17	2	27.5	.060	.579	.055	.055	.639
6	10 49	2	27	.065	.590	.055	.055	.655
1906 July 14	17 24	2–3	67.5	374.047	360.609	−0.031	+0.031	734.656
25	18 7	2	67.5	.048	.629	.029	.029	.677
Aug. 9	18 7	3	68.5	.046	.615	.027	.027	.661
15	17 52	3	66.5	.040	.621	.025	.025	.661
15	18 19	3	66.5	.049	.626	.025	.025	.675
16	18 17	2	67.5	.063	.637	.025	.025	.700
16	18 36	2	67.5	.063	.616	.025	.025	.679
17	17 57	3–4	71	.034	.627	.025	.025	.661
17	18 22	3–4	71	.043	.636	.025	.025	.679
19	18 19	2	73.5	.041	.635	.025	.025	.676
23	18 3	2–3	76.5	.062	.643	.024	.024	.705
24	18 6	3–4	63.5	.044	.626	.023	.023	.670
25	18 1	3	63.5	.005	.630	.023	.023	.635
25	18 26	3	62.5	.000	.625	.023	.023	.625
1907 Jan. 20	10 43	2	17.5	374.008	360.629	+0.003	−0.003	734.637
22	10 8	2	14	373.986	.613	.004	.004	.599
25	10 54	2	7	374.014	.660	.005	.005	.674
26	10 20	2	1.5	.022	.647	.005	.005	.669
27	11 2	1–2	14.5	373.966	.625	.005	.005	.621
28	11 4	2	12	.998	.628	.008	.008	.626
29	10 49	2	4.5	374.007	.639	.008	.008	.646
30	10 14	2	8.5	.001	.644	.008	.008	.645
				Assumed Annual Proper Motion and Mean Sum:		−0.067	+0.067	734.654

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	13.490	−0.000	13.376	$+1.0\,x$	$+1.55\,y$	$-0.85\,z$	$+1.67\,\Delta\beta =$	+0.002	−0.002
	.488	+ .000	.376	1.0	1.43	0.84	2.39	+ .002	− .002
	.483	+ .000	.371	1.0	1.43	0.84	1.93	− .003	− .007
	.495	+ .000	.383	1.0	1.41	0.83	1.63	+ .009	+ .005
	.510	+ .000	.400	1.0	1.36	0.82	2.09	+ .026	+ .022
	.490	+ .000	.380	1.0	1.36	0.82	1.71	+ .006	+ .002
	.481	+ .000	.371	1.0	1.34	0.82	2.28	− .003	− .007
	.475	− .000	.365	1.0	1.34	0.82	1.82	− .009	− .013
S.	13.438	−0.000	13.376	$+1.0\,x$	$-1.92\,y$	$-0.47\,z$	$-1.51\,\Delta\beta =$	+0.002	+0.012
	.419	− .000	.361	1.0	1.94	0.44	2.06	− .013	− .003
	.431	− .000	.377	1.0	1.88	0.40	2.06	+ .003	+ .013
	.419	− .000	.369	1.0	1.83	0.38	1.85	− .005	+ .005
	.423	− .000	.373	1.0	1.83	0.38	2.24	− .001	+ .009
	.426	− .001	.375	1.0	1.82	0.38	2.21	+ .001	+ .011
	.447	− .000	.397	1.0	1.82	0.38	2.53	+ .023	+ .033
	.407	− .000	.357	1.0	1.81	0.37	1.92	− .017	− .007
	.407	− .000	.357	1.0	1.81	0.37	2.29	− .017	− .007
	.406	− .000	.356	1.0	1.77	0.37	2.24	− .018	− .008
	.419	− .001	.370	1.0	1.71	0.36	2.00	− .004	+ .006
	.418	− .000	.372	1.0	1.68	0.35	2.05	− .002	+ .008
	.375	+ .000	.329	1.0	1.67	0.35	1.98	− .045	− .035
	.375	+ .001	.330	1.0	1.67	0.35	2.35	− .044	− .034

α **Bootis** — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.					Residuals.
	R	R	R					R	R
S.	13.379	+0.000	13.385	+1.0 x	+1.88 y	+0.05 z	+1.89 $\Delta\beta$	+0.011	+0.005
	.373	+ .001	.382	1.0	1.88	0.06	2.43	+ .008	+ .002
	.354	− .000	.364	1.0	1.87	0.07	1.75	− .010	− .016
	.375	− .000	.385	1.0	1.87	0.07	2.23	+ .011	+ .005
	.371	+ .001	.382	1.0	1.87	0.07	1.65	+ .008	+ .002
	.370	+ .001	.387	1.0	1.86	0.08	1.63	+ .013	+ .007
	.368	+ .000	.384	1.0	1.86	0.08	1.81	+ .010	+ .004
	.357	+ .000	.373	1.0	1.86	0.08	2.32	− .001	− .007

Assumed Mean Difference: 13.374

Normals.

				R	
+30.00 x	+ 1.01 y	−11.43 z	+ 1.94 $\Delta\beta$	= −0.057	Wt. 12.7
+ 1.01	+89.02	+ 1.37	+103.63	= +0.370	88.0
−11.43	+ 1.37	+ 7.58	− 0.65	= +0.028	3.2

Solution.

	R	R		
x =	−0.0021	±0.0026		
y =	+0.0042	±0.0009	−1.17 $\Delta\beta$	
z =	−0.0000	±0.0052		

$[nn] = 0.00716$ $[vv] = 0.00550$ Prob. Error 1 Eq. = ±″0.118

$\pi = +″0.053 \pm″0.013$

The results of my three series are thus as follows: —

S.	Series VI:	π = +″0.011	±″0.017	Wt. 46.5	Prob. Error 1 Obs. = ±″0.119	62 Obs.
S.	" V:	π = +0.081	±0.017	70.9	±0.140	31
S.	" II:	π = +0.053	±0.013	88.0	±0.118	30

and their combination according to the three methods as described in § 2 leads to the values: —

Method	*α*:	π = +″0.048	±″0.014
"	*β*:	π = +0.053	±0.009
"	*γ*:	π = +0.050	±0.009
Adopted:		π = +″0.050	±″0.011

The somewhat larger probable error by Method *α* would seem to show a small amount of systematic error.

§ 5. Arcturus. Elkin.

On examining the reductions of my former work on Arcturus I found that for Series I the position-angle for star *b* was taken throughout the computations of the refraction correction 10° in error. This slip is partly due to the somewhat awkward numbering of the position-circle which differs 90° from true position-angles.

Applying the correct values I find that the observation on 1887, Jan. 21, which I had before felt constrained to reject is now in fair accordance. The complete and amended data, the proper motion corrections being already applied, are for this series as follows: —

α Bootis	B. D. +19°, 2777	Mag. 1.0	R. A. 14h 9.1m	Decl. +19° 56′	Pos. Angle.
a_1	+20°, 2933	8.2	14 3.0	20 25	289°.5
b_1	+20°, 2968	8.4	14 14.9	20 2	85°.5

Date.			Sid. Time. h.	m.	Temp. °	Im.	St.	Distance a_1 (1886.0). R	Distance b_1 (1886.0). R	Sum. R
1885	July	10	17	54	68	2	2–3	427.023	395.874	822.897
		11	16	43	69	2–3	2–3	.006	.858	.864
		15	16	39	70	2	2–3	.006	.837	.843
		16	16	35	73	2	2–3	.004	.849	.853
		18	17	41	74	2–3	2–3	.017	.850	.867
1886	Jan.	19	10	36	29	2–3	2	426.986	395.807	822.793
		26	11	22	29.5	2–3	2–3	427.002	.817	.819
		20	10	27	23	2–3	2–3	.007	.806	.813
	Feb.	8	10	37	29.5	3	2–3	.006	.814	.820
		14	10	9	38.5	2–3	2–3	.032	.843	.875
1887	Jan.	21	9	20	23	2–3	2–3	427.014	395.849	822.863
	Feb.	11	11	14	28	3–4	3	.042	.812	.854
		16	11	3	40	2–3	2–3	.053	.829	.882
		25	10	9	15	2–3	2	.035	.794	.829
1887	June	28	17	32	65.5	2	2	427.039	395.863	822.902
	July	1	17	30	71	2–3	2–3	.057	.818	.875
		5	17	40	70	...	...	.056	.899	.955
		11	17	47	71	2–3	2–3	.056	.855	.911

Assumed Mean Sum: 822.861

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
E.	31.149	−0.001	31.148	+1.0 x	−1.89 y	−0.48 z =	−0.041	−0.008
	.148	− .000	.148	1.0	1.90	0.47	− .041	− .008
	.169	+ .001	.170	1.0	1.92	0.46	− .019	+ .014
	.155	+ .000	.155	1.0	1.93	0.46	− .034	− .001
	.167	+ 000	.167	1.0	1.93	0.45	− .022	+ .011
E.	31.179	+0.003	31.182	+1.0 x	+1.88 y	+0.05 z =	−0.007	−0.010
	.185	+ .002	.187	1.0	1.87	0.07	− .002	− .006
	.201	+ .002	.203	1.0	1.85	0.08	+ .014	+ .010
	.192	+ .001	.193	1.0	1.79	0.11	+ .004	+ .000
	.189	− .001	.188	1.0	1.72	0.12	− .001	− .005
E.	31.165	−0.000	31.165	+1.0 x	+1.88 y	+1.05 z =	−0.024	−0.046
	.230	+ .000	.230	1.0	1.86	1.11	+ .041	+ .018
	.224	− .001	.223	1.0	1.70	1.13	+ .034	+ .011
	.241	+ .001	.242	1.0	1.54	1.15	+ .053	+ .031
E.	31.176	−0.002	31.174	+1.0 x	−1.75 y	+1.49 z =	−0.015	−0.020
	.239	− .001	.238	1.0	1.81	1.50	+ .049	+ .044
	.157	− .004	.153	1.0	1.85	1.51	− .036	− .041
	.201	− .002	.199	1.0	1.91	1.53	+ .010	+ .005

Assumed Mean Difference: 31.189

Normals:

			R
+18.00 x	− 0.80 y	+ 8.58 z =	−0.037
− 0.80	+60.58	+ 1.91 =	+0.470
+ 8.58	+ 1.91	+15.12 =	+0.207

Solution:

	R	R	
x =	−0.0107	±0.0044	Wt. 13.1
y =	+0.0070	±0.0020	60.1
z =	+0.0190	±0.0047	10.9

$[nn] = 0.01588$ $[vv] = 0.00828$ Prob. Error of 1 Eq. = ±0.″200

π = +0.″089 ±0.″026

The parallax value is now a positive one in close agreement with CHASE's result from the same pair.

My several series are collected together again in the following table:—

E.	Series	I:	$\pi = +0''.089$	$\pm 0''.026$	Wt. 60.1	Prob. Error 1 Obs. $\pm 0''.200$	18 Obs.
E.	"	II:	$\pi = +0.047$	± 0.023	57.3	± 0.173	19
E.	"	III:	$\pi = +0.085$	± 0.036	56.2	± 0.270	18
E.	"	IV:	$\pi = -0.038$	± 0.037	46.4	± 0.250	18
E.	"	V:	$\pi = +0.043$	± 0.038	50.4	± 0.266	17
E.	"	VI:	$\pi = +0.048$	± 0.070	11.8	± 0.241	18
E.	"	VII:	$\pi = +0.080$	± 0.080	3.4	± 0.110	18

These I have combined according to the adopted principles, only multiplying in Method β the weight from the single star Series VII by 6.63 as explained in my original work. This leads to the values:—

Method α:	$\pi = +0''.051$	$\pm 0''.011$
" β:	$\pi = +0.050$	± 0.014
" γ:	$\pi = +0.053$	± 0.013
Adopted:	$\pi = +0''.051$	$\pm 0''.013$

It appears from the smaller value of the probable error by Method α that no systematic error is indicated for me in these Arcturus series.

§ 6. ARCTURUS. FINAL VALUE.

The adopted parallax values for each of the three observers brought together are as follows:—

ELKIN:	$\pi = +0''.051$	$\pm 0''.013$	Average Prob. Error 1 Obs.	$\pm 0''.240$	126 Obs.
CHASE:	$\pi = +0.085$	± 0.007		± 0.127	154
SMITH:	$\pi = +0.050$	± 0.011		± 0.126	123

These we combine in essentially the same manner as adopted for the several series of one observer, viz.: α, by giving equal weights to each observer; β, by the total weights derived from the solutions; ELKIN's, however, being reduced by the factor $(0.126:0.240)^2 = 0.275$; and γ, by weights based upon the observational probable errors, $\pm 0''.126$ being considered as unity.

The relative weights for the last two methods are:—

	ELKIN.	CHASE.	SMITH.
Method β:	84	223	205
" γ:	94	324	143

We thus get the following combined values: —

Method	α:	$\pi = +0''.062$	$\pm 0''.0081$
"	β:	$\pi = +0.065$	± 0.0056
"	γ:	$\pi = +0.070$	± 0.0053

the mean of which we give as our final value: —

Arcturus: $\pi = +0''.066 \pm 0''.006$.

§ 7. 61 Cygni. Chase.

The historic interest attaching to this star, coupled with the divergences of the careful micrometric determinations, notably those of Hall and Peter, from the results earlier obtained, both of which are considerably smaller, as are likewise those derived by photographic methods, and the possibility of a different parallax for the two components as found by Wilsing and Davis, Kapteyn and Peter, the former two finding larger values for 61_1 Cygni, while the latter two reached precisely the opposite conclusion, — all this made it seem well worth while to add the evidence of a quite extended investigation with the Yale Heliometer.

Two pairs of comparison stars were selected, with position angles differing by approximately 76 degrees, the average direction of the first pair from 61 Cygni making an angle of about 27 degrees with the line connecting the components, while the second pair lacks but 13 degrees of being at right angles to this line. From ten to twelve nights' observations on both components were secured at each of five consecutive epochs of maximum parallactic displacement, in all 230 complete sets. The observations and other data follow: —

61_1 Cygni	**B. D. $+38°, 4343$**			**Mag. 5.0**		**R. A. $21^h\ 0.4^m$**		**Decl. $+38°\ 2.5'$**		**Pos. Angle.**		
61_2 Cygni	**$+38°, 4344$**			**5.3**		**21 0.4**		**38 2.4**				
a	$+38°, 4306$			6.5		20 54.1		38 15		$277°\ 39'$		
b	$+37°, 4229$			8.4		21 7.6		37 48		$101°\ 5'$		
Date.	Sid. Time.	Def.	Temp.	Distance *a*. 61_1 Cygni.	Distance *a*. 61_2 Cygni.	Distance *b*. 61_2 Cygni.	Distance *b*. 61_1 Cygni.	P. M. Corrections.				
	h. m.		°	R	R	R	R	R	R	R	R	
1904 Oct. 29	1 8	–	28.5	369.504	371.059	398.381	399.948	+0.355	+0.354	−0.308	−0.302	
31	0 49	3–4	33	.498	.058	.380	.952	.352	.351	.305	.299	
Nov. 1	1 20	3	39	.499	.061	.369	.936	.351	.350	.304	.298	
2	1 16	3–4	44.5	.513	.066	.376	.991	.350	.349	.304	.297	
7	1 48	2	30.5	.479	.037	.352	.935	.346	.345	.300	.294	
8	1 17	–	34	.520	.068	.354	.932	.345	.344	.299	.294	
11	1 57	3	29.5	.517	.076	.373	.942	.343	.342	.298	.292	
19	1 2	–	37.5	.519	.084	.366	.963	.337	.336	.292	.286	
25	1 39	–	29.5	.544	093	.356	.976	.332	.331	.287	.282	
26	1 46	2–3	24.5	.537	.086	.350	.957	.331	.330	.287	.281	

61 Cygni — *continued.*

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. 61_1 Cygni. R	Distance *a*. 61_2 Cygni. R	Distance *b*. 61_2 Cygni. R	Distance *b*. 61_1 Cygni. R	P. M. Corrections. R	R	R	R
1904 Nov. 27	2	3	2–3	22	369.543	371.090	398.378	399.959	+0.330	+0.329	−0.286	−0.281
28	1	30	2	13.5	.517	.076	.349	.943	.329	.328	.285	.280
1905 Apr. 23	16	37	2–3	35.5	369.679	371.205	398.212	399.786	+0.208	+0.207	−0.181	−0.177
27	16	48	3–4	46	.718	.252	.213	.779	.205	.204	.178	.174
May 1	16	46	2–3	34.5	.690	.232	.185	.771	.201	.201	.175	.171
8	16	53	3–4	46.5	.727	.264	.232	.788	.196	.195	.170	.167
9	17	13	3	44	.749	.295	.221	.795	.195	.194	.169	.166
20	17	16	2–3	43.5	.716	.253	.194	.801	.185	.185	.161	.158
21	17	28	2–3	42.5	.727	.278	.192	.786	.185	.184	.160	.157
24	17	25	3	46	.740	.275	.205	.806	.182	.182	.158	.155
25	17	44	2	54	.730	.309	.187	.794	.181	.181	.157	.154
June 1	17	11	3–4	48.5	.745	.294	.194	.793	.175	.175	.152	.149
3	17	36	3	54	.752	.302	.199	.798	.174	.173	.151	.148
9	16	39	2–3	57.5	.744	.307	.193	.796	.169	.169	.147	.144
1905 Oct. 7	1	2	3	44	369.809	371.357	398.146	399.738	+0.070	+0.070	−0.061	−0.059
8	0	59	3–4	53	.810	.344	.152	.741	.069	.069	.060	.059
9	1	2	3–4	55.5	.802	.344	.141	.745	.068	.068	.059	.058
12	0	41	3–4	40.5	.799	.345	.142	.749	.066	.066	.057	.056
13	1	34	3–4	48.5	.805	.353	.141	.710	.065	.065	.056	.055
17	1	42	2	49.5	.803	.361	.145	.736	.062	.061	.053	.052
21	1	6	3–4	36	.815	.381	.111	.717	.058	.058	.051	.050
22	1	9	2–3	38.5	.809	.370	.132	.724	.057	.057	.050	.049
26	1	28	3–4	32	.822	.389	.130	.715	.054	.054	.047	.046
Nov. 8	1	29	2	35.5	.831	.388	.120	.711	.043	.043	.038	.037
9	1	15	3	33.5	.810	.376	.095	.682	.043	.043	.037	.036
14	1	19	2	20	.830	.387	.129	.715	.039	.039	.034	.033
1906 May 9	16	45	3–4	40.5	370.006	371.585	397.943	399.539	−0.107	−0.107	+0.093	+0.091
14	16	51	3–4	42	.020	.575	.942	.549	.111	.111	.097	.095
18	17	50	3	65	.031	.563	.947	.550	.115	.114	.100	.098
19	17	34	3–4	53.5	.022	.571	.933	.527	.116	.115	.100	.098
20	17	0	2–3	44.5	.021	.590	.961	.531	.117	.116	.101	.099
22	17	4	2	46	.033	.575	.946	.532	.118	.118	.102	.100
23	16	57	2–3	52.5	.036	.595	.927	.543	.119	.118	.103	.101
25	16	47	3	59.5	.027	.586	.937	.538	.120	.120	.105	.103
29	16	13	2–3	48.5	.041	.576	.940	.514	.125	.124	.108	.106
June 3	16	31	3	63	.039	.594	.938	.536	.128	.127	.111	.109
10	17	9	3–4	61.5	.055	.603	.945	.523	.133	.133	.116	.114
11	16	31	2	53	.036	.590	.935	.531	.134	.134	.117	.114
1906 Oct. 11	1	44	3–4	36	370.092	371.619	397.860	399.443	−0.235	−0.234	+0.204	+0.200
12	1	51	2–3	36	.090	.630	.855	.445	.236	.235	.205	.201
14	1	54	3–4	43.5	.087	.639	.875	.465	.238	.237	.206	.202
16	1	40	2–3	48.5	.106	.670	.863	.484	.239	.239	.208	.204
25	1	56	2–3	51	.125	.657	.852	.467	.247	.246	.214	.210
26	1	51	2	46.5	.098	.642	.866	.452	.248	.247	.215	.211
Nov. 1	1	59	3–4	34.5	.135	.664	.861	.438	.252	.252	.219	.215
3	1	45	2–3	44	.103	.664	.835	.420	.254	.253	.221	.216
4	1	34	3–4	37	.116	.657	.846	.456	.255	.254	.221	.217
7	2	7	2	36	.097	.658	.828	.424	.257	.256	.223	.219
8	2	3	2	34	.108	.657	.830	.432	.258	.257	.224	.220
12	1	52	2–3	33	.103	.637	.831	.453	.262	.261	.227	.223
Assumed Annual Proper Motion:									+0.302	+0.301	−0.262	−0.257

61 Cygni — *continued.*

Observer.	Corrected Sum.	Difference.	61_1 Cygni. Scale Value Correction.	Corrected Difference.	Difference.	61_2 Cygni. Scale Value Correction.	Corrected Difference.
	R	R	R	R	R	R	R
C.	1538.991	30.444	+0.001	29.788	27.322	+0.001	26.661
	.987	.454	+ .001	.804	.322	+ .001	.667
	.964	.437	+ .001	.789	.308	+ .001	.655
	1539.044	.478	− .000	.831	.310	− .000	.657
	1538.900	.456	+ .001	.817	.315	+ .001	.671
	.970	.412	+ .001	.774	.286	+ .001	.644
	1539.003	.425	+ .001	.791	.297	+ .000	.657
	.027	.444	+ .000	.821	.282	+ .000	.654
	.063	.432	− .001	.817	.263	− .001	.644
	.023	.420	+ .000	.808	.264	+ .000	.647
	.062	.416	− .001	.804	.288	− .001	.672
	1538.977	.426	+ .001	.818	.273	+ .001	.661
C.	1538.939	30.107	+0.002	29.724	27.007	+0.002	26.621
	1539.019	.061	+ .000	.682	26.961	+ .000	.579
	1538.934	.081	− .000	.709	.953	− .000	.577
	1539.065	.061	− .001	.697	.968	− .001	.602
	.114	.046	− .002	.683	.926	− .002	.561
	.015	.085	+ .000	.742	.941	+ .000	.595
	.035	.059	− .000	.717	.914	− .000	.570
	.077	.066	− .001	.728	.930	− .001	.589
	.071	.064	− .001	.728	.878	− .001	.539
	.075	.048	− .001	.723	.900	− .001	.572
	.099	.046	− .001	.723	.897	− .001	.572
	.087	.052	− .001	.738	.886	− .001	.569
C.	1539.070	29.929	−0.001	29.799	26.789	−0.001	26.657
	.066	.931	− .001	.802	.808	− .001	.678
	.051	.943	− .000	.817	.797	− .000	.670
	.054	.950	− .000	.828	.797	− .000	.674
	.028	.905	+ .000	.785	.788	+ .000	.667
	.063	.933	− .001	.818	.784	− .001	.669
	.039	.902	− .000	.794	.730	− .000	.621
	.050	.915	− .000	.809	.762	− .000	.655
	071	.893	− .001	.792	.741	− .001	.639
	.061	.880	− .001	.799	.732	− .001	.650
	1538.976	.872	+ .001	.794	.719	+ .001	.640
	1539.072	.885	− .001	.812	.742	− .001	.668
C.	1539.043	29.533	−0.000	29.731	26.358	−0.000	26.558
	.056	.529	− .001	.734	.367	− .000	.575
	.060	.519	− .001	.731	.384	− .001	.597
	.020	.505	+ .000	.719	.362	+ .000	.577
	.070	.510	− .001	.725	.371	− .001	.587
	.052	.499	− .000	.717	.371	− .000	.591
	.068	.507	− .001	.726	.332	− .001	.552
	.056	.511	− .001	.733	.351	− .000	.576
	.036	.473	− .000	.704	.364	− .000	.596
	.072	.497	− .001	.733	.344	− .001	.581
	.090	.468	− .001	.714	.342	− .001	.590
	.055	.495	− .001	.742	.345	− .000	.596
C.	1538.949	29.351	+0.002	29.788	26.241	+0.001	26.680
	.955	.355	+ .001	.793	.225	+ .001	.666
	.999	.378	+ .001	.819	.236	+ .001	.680
	1539.057	.378	− .001	.820	.193	− .000	.640
	.032	.342	− .000	.799	.195	− .000	.655

61 Cygni — *continued.*

Observer.	Corrected Sum.	Difference.	61_1 Cygni. Scale Value Correction.	Corrected Difference.	Difference.	61_2 Cygni. Scale Value Correction.	Corrected Difference.
	R	R	R	R	R	R	R
C.	1538.989	29.354	+0.001	29.814	26.224	+0.001	26.687
	1539.028	.303	+ .000	.770	.197	+ .000	.668
	1538.952	.317	+ .001	.788	.171	+ .001	.646
	1539.004	.340	+ .000	.812	.189	+ .000	.664
	1538.936	.327	+ .002	.805	.170	+ .002	.651
	.956	.324	+ .001	.803	.173	+ .001	.655
Assumed	.951	.350	+ .001	.836	.194	+ .001	.683
Means:	1539.029			29.763			26.621

Equations of Condition.			61_1 Cygni. R	Residuals. R	61_2 Cygni. R	Residuals. R
+1.00 x	+1.87 y	−1.18 z =	+0.025	−0.018	+0.040	+0.001
1.00	1.85	1.17	+ .041	− .002	+ .046	+ .008
1.00	1.84	1.16	+ .026	− .016	+ .034	− .004
1.00	1.84	1.16	+ .068	+ .025	+ .036	− .002
1.00	1.80	1.15	+ .054	+ .012	+ .050	+ .013
1.00	1.79	1.14	+ .011	− .030	+ .023	− .014
1.00	1.76	1.14	+ .028	− .012	+ .036	− .000
1.00	1.66	1.11	+ .058	+ .020	+ .033	− .001
1.00	1.59	1.10	+ .054	+ .018	+ .023	− .009
1.00	1.58	1.10	+ .045	+ .009	+ .026	− .006
1.00	1.56	1.09	+ .041	+ .005	+ .051	+ .019
1.00	1.55	1.09	+ .055	+ .020	+ .040	+ .008
+1.00 x	−1.87 y	−0.69 z =	−0.039	+0.009	−0.000	+0.047
1.00	1.87	0.68	− .081	− .033	− .042	+ .005
1.00	1.86	0.67	− .054	− .006	− .044	+ .003
1.00	1.81	0.65	− .066	− .020	− .019	+ .027
1.00	1.80	0.65	− .080	− .034	− .060	− .015
1.00	1.69	0.61	− .021	+ .022	− .026	+ .017
1.00	1.68	0.61	− .046	− .003	− .051	− .008
1.00	1.64	0.60	− .035	+ .007	− .032	+ .009
1.00	1.62	0.60	− .035	+ .007	− .082	− .041
1.00	1.51	0.58	− .040	− .001	− .049	− .011
1.00	1.46	0.58	− .040	− .002	− .049	− .012
1.00	1.33	0.56	− .025	+ .010	− .052	− .018
+1.00 x	+1.72 y	−0.23 z =	+0.036	−0.004	+0.036	−0.001
1.00	1.73	0.23	+ .039	− .001	+ .057	+ .020
1.00	1.74	0.23	+ .054	+ .013	+ .049	+ .011
1.00	1.77	0.22	+ .065	+ .024	+ .053	+ .015
1.00	1.78	0.22	+ .022	− .019	+ .046	+ .007
1.00	1.81	0.20	+ .055	+ .013	+ .048	+ .009
1.00	1.84	0.19	+ .031	− .012	+ .000	− .040
1.00	1.84	0.19	+ .046	+ .003	+ .034	− .006
1.00	1.87	0.18	+ .029	− .015	+ .018	− .023
1.00	1.79	0.14	+ .036	− .006	+ .029	− .010
1.00	1.78	0.14	+ .031	− .011	+ .019	− .020
1.00	1.72	0.13	+ .049	+ .009	+ .047	+ .010
+1.00 x	−1.80 y	+0.35 z =	−0.032	+0.013	−0.063	−0.020
1.00	1.75	0.37	− .029	+ .015	− .046	− .004
1.00	1.71	0.38	− .032	+ .011	− .024	+ .017
1.00	1.70	0.38	− .044	− .001	− .044	− .003
1.00	1.69	0.39	− .038	+ .005	− .034	+ .007
1.00	1.67	0.39	− .046	− .004	− .030	+ .010
1.00	1.65	0.39	− .037	+ .005	− .069	− .029

61 Cygni — *continued.*

Equations of Condition.			61_1 Cygni. R	Residuals. R	61_2 Cygni. R	Residuals. R
$+1.00\,x$	$-1.62\,y$	$+0.40\,z$ =	−0.030	+0.011	−0.045	−0.006
1.00	1.57	0.41	− .059	− .019	− .025	+ .013
1.00	1.46	0.42	− .030	+ .007	− .040	− .005
1.00	1.31	0.44	− .049	− .015	− .031	+ .001
1.00	1.29	0.44	− .021	+ .012	− .025	+ .006
$+1.00\,x$	$+1.76\,y$	$+0.78\,z$ =	+0.025	−0.016	+0.059	+0.019
1.00	1.77	0.78	+ .030	− .012	+ .045	+ .005
1.00	1.79	0.79	+ .056	+ .014	+ .059	+ .018
1.00	1.80	0.79	+ .057	+ .014	+ .019	− .022
1.00	1.86	0.82	+ .036	− .008	+ .034	− .008
1.00	1.87	0.82	+ .051	+ .007	+ .066	+ .023
1.00	1.84	0.84	+ .007	− .036	+ .047	+ .005
1.00	1.83	0.84	+ .025	− .018	+ .025	− .017
1.00	1.83	0.84	+ .049	+ .006	+ .043	+ .001
1.00	1.80	0.85	+ .042	− .000	+ .030	− .011
1.00	1.79	0.86	+ .040	− .002	+ .034	− .007
1.00	1.74	0.87	+ .073	+ .032	+ .062	+ .022

Normals:

61_1 Cygni.			R	61_2 Cygni.			R
$+60.00\,x$	$+24.40\,y$	$-8.73\,z$ =	+0.481	$+60.00\,x$	$+24.40\,y$	$-8.73\,z$ =	+0.414
+24.40	+178.44	− 4.67	= +4.308	+24.40	+178.44	− 4.67	= +4.079
− 8.73	− 4.67	+30.59	= −0.082	− 8.73	− 4.67	+30.59	= −0.029

Solution:

	R	R		R	R	
61_1 Cygni.	x = −0.0018	±0.0013	Wt. 54.51	61_2 Cygni.	x = −0.0023	±0.0015	Wt. 54.51
	y = +0.0244	±0.0008	168.48		y = +0.0232	±0.0008	168.48
	z = +0.0005	±0.0019	29.31		z = +0.0019	±0.0020	29.31

$[nn] = 0.11856$ $[vv] = 0.01421$ — Prob. Error 1 Eq. = ±0.″135 — $\pi_1 = +0.″309 \pm 0.″010$

$[nn] = 0.10894$ $[vv] = 0.01520$ — Prob. Error 1 Eq. = ±0.″139 — $\pi_2 = +0.″295 \pm 0.″011$

						Distance *c*.		Distance *d*.		P. M. Corrections.			
Date.		Sid. Time. h.	m.	Def.	Temp. °	61_1 Cygni. R	61_2 Cygni. R	61_2 Cygni. R	61_1 Cygni. R	R	R	R	R
1904	Dec. 18	2	13	2–3	18.5	472.157	471.799	460.709	460.274	+0.385	+0.372	−0.358	−0.376
	21	2	8	3	15	.162	.797	.708	.249	.383	.370	.355	.373
	29	1	18	3	23	.126	.778	.674	.224	.375	.362	.348	.365
	31	2	11	3–4	38.5	.189	.814	.687	.235	.373	.360	.346	.363
1905	Jan. 1	1	50	2	38.5	.156	.804	.671	.253	.372	.359	.345	.362
	8	2	10	3	25	.154	.787	.652	.230	.365	.352	.338	.355
	14	2	7	2	13.5	.172	.801	.662	.219	.359	.346	.333	.349
	15	2	7	2–3	19	.132	.796	.652	.218	.358	.345	.332	.348
	16	2	11	2	20	.138	.811	.628	.195	.357	.344	.331	.347
	18	2	17	3	27	.176	.800	.653	.223	.355	.342	.329	.345
1905	June 15	16	53	–	65.5	472.379	472.059	460.518	460.087	+0.203	+0.196	−0.189	−0.198
	25	17	22	2–3	68.5	.402	.037	.554	.072	.193	.187	.180	.188
	27	17	30	3–4	54.5	.419	.052	.521	.052	.191	.185	.177	.186
	30	17	43	2–3	62.5	.405	.059	.503	.039	.188	.182	.175	.183
	July 3	17	45	2	66	.418	.057	.503	.063	.185	.178	.171	.180
	4	17	25	1–2	65	.421	.051	.488	.041	.184	.177	.171	.179

61_1 Cygni	**B. D. +38°, 4343**	**Mag. 5.0**	**R. A. 21h 0.4m**	**Decl. +38° 2.5′**
61_2 Cygni	**+38°, 4344**	**5.3**	**21 0.4**	**38 2.4**
c	+36°, 4379	7.5	20 57.1	36 35
d	+39°, 4461	8.4	21 4.0	39 35

Pos. Angle.

205° 3′

22°53′

61 Cygni — *continued.*

Date.		Sid. Time. h.	m.	Def.	Temp.	Distance *c*. 61₁ Cygni. R	61₂ Cygni. R	Distance *d*. 61₂ Cygni. R	61₁ Cygni. R	P. M. Corrections. R	R	R	R
1905	July 15	17	26	2–3	66.5	472.423	472.071	460.488	460.045	+0.173	+0.167	−0.161	−0.168
	17	17	9	3–4	81	.444	.073	.510	.041	.171	.165	.158	.166
	18	17	9	3	80.5	.443	.085	.540	.066	.170	.164	.157	.165
	19	17	37	2–3	71.5	.444	.076	.513	.069	.169	.163	.156	.164
	25	18	0	1–2	64	.434	.082	.488	.046	.163	.158	.152	.159
	26	17	35	3	62.5	.460	.097	.496	.055	.162	.157	.151	.158
1905	Nov. 21	2	4	3–4	33	472.533	472.168	460.369	459.962	+0.041	+0.040	−0.038	−0.041
	27	1	42	2–3	32.5	.512	.183	.395	.948	.035	.033	.032	.034
	Dec. 7	1	11	–	33	.549	.170	.397	.950	.025	.024	.023	.024
	22	2	23	2–3	40.5	.591	.218	.398	.944	.009	.009	.009	.009
	26	1	5	1–2	31.5	.537	.182	.371	.904	.005	.005	.005	.005
	27	2	0	3	32.5	.560	.144	.366	.915	.004	.004	.004	.004
	28	1	13	3	35.5	.565	.201	.403	.929	.003	.003	.003	.003
1906	Jan. 1	1	25	2	27.5	.549	.189	.373	.914	− .001	− .001	+ .001	+ .001
	7	1	34	1–2	27	.536	.194	.336	.892	.007	.007	.007	.007
	10	1	54	3	19.5	.542	.177	.358	.911	.010	.010	.009	.010
	17	2	11	3	30.5	.602	.218	.382	.901	.017	.017	.016	.017
1906	May 25	17	56	3	59.5	472.773	472.400	460.215	459.744	−0.148	−0.143	+0.137	+0.144
	29	17	13	2–3	46	.753	.364	.189	.750	.152	.147	.141	.148
	June 11	17	32	2	52	.786	.378	.187	.711	.165	.159	.153	.161
	14	16	43	2	60.5	.747	.406	.177	.710	.168	.162	.156	.164
	14	17	44	2	60	.766	.398	.170	.721	.168	.162	.156	.164
	20	16	26	3	59.5	.767	.384	.162	.705	.175	.168	.162	.170
	22	16	55	3	64	.787	.400	.153	.700	.176	.170	.164	.172
	29	17	4	2	74.5	.801	.437	.169	.705	.184	.177	.171	.179
	July 12	16	36	1–2	67	.789	.425	.151	.693	.197	.190	.183	.192
	12	17	34	1–2	66.5	.806	.417	.121	.684	.197	.190	.183	.192
	13	16	43	3	66.5	.802	.426	.155	.683	.198	.191	.184	.193
	13	17	39	3	65.5	.788	.423	.133	.682	.198	.191	.184	.193
1906	Dec. 11	1	55	3–4	17	472.890	472.492	460.057	459.550	−0.352	−0.340	+0.327	+0.343
	18	2	2	2–3	15	.889	.509	.032	.544	.362	.349	.336	.352
	26	1	1	2	31	.882	.515	459.994	.537	.367	.355	.341	.358
1907	Jan. 4	1	35	1–2	38.5	.914	.525	460.008	.534	.377	.364	.350	.367
	5	1	7	2	38	.913	.522	459.998	.541	.378	.365	.351	.368
	5	2	7	2	37.5	.905	.541	460.016	.539	.378	.365	.351	.368
	10	1	34	2	28.5	.886	.505	459.953	.494	.383	.370	.354	.373
	11	1	54	2–3	33	.919	.548	.977	.518	.384	.371	.355	.374
	21	2	10	2	18	.905	.522	.963	.482	.394	.381	.366	.384
	23	2	8	3	3.5	.915	.544	.949	.463	.396	.383	.368	.386
										Assumed Annual Proper Motion:			
										+0.373	+0.360	−0.346	−0.363

Corrected Sum. R	Difference. R	61₁ Cygni. Scale Value Correction. R	Corrected Difference. R	Difference. R	61₂ Cygni. Scale Value Correction. R	Corrected Difference. R
1864.963	11.883	+0.000	12.645	11.090	+0.000	11.820
.941	.913	+ .000	.669	.089	+ .000	.814
.826	.902	+ .001	.643	.104	+ .001	.815
.949	.954	+ .000	.690	.127	+ .000	.833
.908	.903	+ .001	.638	.133	+ .001	.838
.847	.924	+ .001	.645	.135	+ .001	.826
.877	.953	+ .001	.662	.139	+ .001	.819
.821	.914	+ .001	.621	.144	+ .001	.822
.795	.943	+ .001	.648	.183	+ .001	.859
.875	.953	+ .001	.654	.147	+ .001	.819
1865.055	12.292	−0.000	12.693	11.541	−0.000	11.926
.077	.330	− .001	.710	.483	− .001	.849

61 Cygni — *continued.*

Corrected Sum. R	Difference. R	61_1 Cygni. Scale Value Correction. R	Corrected Difference. R	Difference. R	61_2 Cygni. Scale Value Correction. R	Corrected Difference. R
1865.057	12.367	−0.000	12.744	11.531	−0.000	11.893
.018	.366	− .000	.737	.556	− .000	.913
.053	.355	− .000	.720	.554	− .000	.903
.012	.380	− .000	.743	.563	− .000	.911
.038	.378	− .000	.719	.583	− .000	.911
.080	.403	− .001	.739	.563	− .001	.885
.146	.377	− .001	.711	.545	− .001	.865
.114	.375	− .001	.707	.563	− .001	.881
.060	.388	− .000	.710	.594	− .000	.904
.118	.405	− .001	.724	.601	− .001	.908
1865.034	12.571	−0.000	12.653	11.799	−0.000	11.877
.040	.564	− .000	.633	.788	− .000	.853
.068	.599	− .000	.648	.773	− .000	.820
.151	.647	− .001	.664	.820	− .001	.837
1864.994	.633	+ .000	.643	.811	+ .000	.821
.985	.645	+ .000	.653	.778	+ .000	.786
1865.098	.636	− .001	.641	.798	− .001	.803
.025	.635	− .000	.633	.816	− .000	.814
1864.958	.644	+ .000	.630	.858	+ .000	.844
.987	.631	+ .000	.611	.819	+ .000	.800
1865.102	.701	− .001	.666	.836	− .001	.802
1865.122	13.029	−0.001	12.736	12.185	−0.001	11.904
.046	.003	− .000	.703	.175	− .000	.887
.052	.075	− .000	.749	.191	− .000	.879
.030	.037	− .000	.705	.229	− .000	.911
.045	.045	− .000	.713	.228	− .000	.910
.007	.062	+ .000	.717	.222	+ .000	.892
.030	.087	− .000	.739	.247	− .000	.913
.101	.096	− .001	.732	.268	− .001	.919
.046	.096	− .000	.707	.274	− .000	.901
.016	.122	− .000	.733	.296	− .000	.923
.054	.119	− .000	.728	.271	− .000	.896
.014	.106	− .000	.715	.290	− .000	.915
1864.967	13.340	+0.000	12.645	12.435	+0.000	11.768
.951	.345	+ .000	.631	.477	+ .000	.792
.905	.345	+ .001	.621	.521	+ .001	.826
.957	.380	+ .000	.636	.517	+ .000	.803
.950	.372	+ .000	.626	.524	+ .000	.808
.977	.366	+ .000	.620	.525	+ .000	.809
.812	.392	+ .001	.637	.552	+ .001	.829
.936	.401	+ .000	.643	.571	+ .000	.845
.847	.423	+ .001	.645	.559	+ .001	.813
.846	.452	+ .001	.671	.595	+ .001	.845
Assumed Means: 1864.996			12.683			11.860

Equations of Condition.			61_1 Cygni. R	Residuals. R	61_2 Cygni. R	Residuals. R
$+1.00\,x$	$-1.80\,y$	$-1.03\,z$ =	−0.038	−0.003	−0.040	−0.003
1.00	1.81	1.03	− .014	+ .021	− .046	− .009
1.00	1.82	1.01	− .040	− .005	− .045	− .008
1.00	1.82	1.00	+ .007	+ .042	− .027	+ .010
1.00	1.82	1.00	− .045	− .010	− .022	+ .015
1.00	1.78	1.00	− .038	− .003	− .034	+ .002
1.00	1.74	0.96	− .021	+ .013	− .041	− .005
1.00	1.73	0.96	− .062	− .028	− .038	− .003
1.00	1.72	0.96	− .035	− .002	− .001	+ .034
1.00	1.71	0.95	− .029	+ .004	− .041	− .006

61 Cygni — *continued.*

Equations of Condition.				61_1 Cygni. R	Residuals. R	61_2 Cygni. R	Residuals. R
+1.00 x	+1.84 y	−0.54 z	=	+0.010	−0.032	+0.066	+0.024
1.00	1.89	0.52		+ .027	− .016	− .011	− .054
1.00	1.90	0.51		+ .061	+ .017	+ .033	− .010
1.00	1.89	0.50		+ .054	+ .011	+ .053	+ .010
1.00	1.88	0.49		+ .037	− .006	+ .043	− .000
1.00	1.88	0.49		+ .060	+ .017	+ .051	+ .008
1.00	1.83	0.46		+ .036	− .006	+ .051	+ .009
1.00	1.82	0.46		+ .056	+ .014	+ .025	− .017
1.00	1.81	0.45		+ .028	− .013	+ .005	− .036
1.00	1.80	0.45		+ .024	− .017	+ .021	− .020
1.00	1.71	0.44		+ .027	− .012	+ .044	+ .005
1.00	1.70	0.43		+ .041	+ .002	+ .048	+ .009
+1.00 x	−1.46 y	−0.11 z	=	−0.030	+0.002	+0.017	+0.049
1.00	1.55	0.09		− .050	− .016	− .007	+ .027
1.00	1.68	0.07		− .035	+ .002	− .040	− .003
1.00	1.82	0.02		− .019	+ .020	− .023	+ .017
1.00	1.83	0.01		− .040	+ .001	− .039	+ .001
1.00	1.82	0.01		− .030	+ .010	− .074	− .034
1.00	1.82	0.01		− .042	− .002	− .057	− .017
1.00	1.82	+0.00		− .050	− .010	− .046	− .006
1.00	1.80	0.02		− .053	− .013	− .016	+ .024
1.00	1.77	0.03		− .072	− .032	− .060	− .021
1.00	1.72	0.05		− .017	+ .021	− .058	− .020
+1.00 x	+1.58 y	+0.40 z	=	+0.053	+0.021	+0.044	+0.010
1.00	1.64	0.41		+ .020	+ .013	+ .027	− .008
1.00	1.81	0.44		+ .066	+ .029	+ .019	− .020
1.00	1.84	0.45		+ .022	− .015	+ .051	+ .012
1.00	1.84	0.45		+ .030	− .007	+ .050	+ .011
1.00	1.88	0.47		+ .034	− .004	+ .032	− .009
1.00	1.88	0.47		+ .056	+ .018	+ .053	+ .013
1.00	1.90	0.49		+ .049	+ .010	+ .059	+ .018
1.00	1.84	0.53		+ .024	− .013	+ .041	+ .002
1.00	1.84	0.53		+ .050	+ .013	+ .063	+ .025
1.00	1.83	0.53		+ .045	+ .008	+ .036	− .003
1.00	1.83	0.53		+ .032	− .005	+ .055	+ .016
+1.00 x	−1.74 y	+0.94 z	=	−0.038	+0.005	−0.092	−0.051
1.00	1.80	0.97		− .052	− .007	− .068	− .026
1.00	1.83	0.98		− .062	− .016	− .034	+ .009
1.00	1.81	1.01		− .047	− .001	− .057	− .014
1.00	1.81	1.01		− .057	− .011	− .052	− .009
1.00	1.81	1.01		− .063	− .017	− .051	− .008
1.00	1.76	1.03		− .046	− .002	− .031	+ .010
1.00	1.76	1.03		− .040	+ .004	− .015	+ .027
1.00	1.68	1.06		− .037	+ .006	− .047	− .007
1.00	1.65	1.06		− .012	+ .030	− .015	+ .024

Normals:

	61_1 Cygni.			R
+55.00 x	− 10.83 y	− 0.04 z	=	−0.267
−10.83	+175.58	− 0.10	=	+3.852
− 0.04	− 0.10	+25.47	=	−0.131

Solution:

	R	R		
x =	−0.0005	±0.0014	Wt.	54.35
y =	+0.0219	±0.0008		173.45
z =	−0.0051	±0.0021		25.47

$[nn] = 0.09827$ $[vv] = 0.01317$

Prob. Error 1 Eq. = ±″0.136

π_1 = +″0.279 ±″0.010

Normals:

	61_2 Cygni.			R
+55.00 x	− 10.83 y	− 0.04 z	=	−0.235
−10.83	+175.58	− 0.10	=	+3.873
− 0.04	− 0.10	+25.47	=	−0.075

Solution:

	R	R		
x =	+0.0001	±0.0019	Wt.	54.35
y =	+0.0221	±0.0010		173.45
z =	−0.0028	±0.0027		25.47

$[nn] = 0.10690$ $[vv] = 0.02126$

Prob. Error 1 Eq. = ±″0.175

π_2 = +″0.281 ±″0.013

The four results brought together are:—

C. 61_1 Cygni, Series I:	$\pi = +0''.309$	$\pm 0''.011$	Wt. 168.5	Prob. Error 1 Obs. $\pm 0''.135$	60 Obs.
C. 61_1 Cygni, Series II:	$\pi = +0.279$	± 0.010	173.4	± 0.136	55
C. 61_2 Cygni, Series I:	$\pi = +0.295$	± 0.011	168.5	± 0.139	60
C. 61_2 Cygni, Series II:	$\pi = +0.281$	± 0.013	173.4	± 0.175	55

from which in the adopted manner we derive:—

Method α:	$\pi = +0''.291$	$\pm 0''.0047$
" β:	$\pi = +0.291$	± 0.0056
" γ:	$\pi = +0.292$	± 0.0054

the mean of which gives my final value:—

61 Cygni: $\pi = +0''.291 \quad \pm 0''.005$

In conclusion it might be noted that the heliometer determinations by Dr. PETER in which a reversing prism eyepiece was employed, and the best photographic investigations which also are presumably free from systematic error, give results not much at variance with that I have derived. Finally, the close agreement of my values for the two components does not confirm the inference referred to above that the two stars are not physically connected.

§ 8. GROOMBRIDGE 1830. SMITH.

The importance and interest of this star are hardly less than those of Arcturus and 61 Cygni and the uncertainty yet remaining in the parallax is very manifest in BIGOURDAN'S Synopsis (BULLETIN ASTRON., 1909).

It was therefore taken up in November, 1904, but in the winter of 1905–6 only two observations were secured. It was then begun again in December, 1907, and a symmetrical series of 32 observations was completed.

The proper motion correction was computed from the value 7".07 in the direction 145°.2 for the two dates 1905.0 and 1909.0, and an interpolated value used.

As different scale divisions were used in the later series owing to the star's motion, it will be necessary either to consider both series separately as is done in the following *Solution A*, or in combining them to take a different x for each. This is done in *Solution B*, in which also the first series is given the weight ¼ relative to the second, the probable error of one observation corresponding about to this ratio. This *Solution B* may be considered to give my adopted parallax value from this pair of stars; inclusive of the adopted systematic error its error is ±0".013.

Groom. 1830	B. D. +38°, 2285	Mag. 6.5	R. A. 11h 44.6m	Decl. +38° 45′	Pos. Angle.
a	38°, 2275	8.4	11 37.2	38 44	272°.0
b	38°, 2294	7.8	11 51.3	38 41	89°.6

Date.		Sid. Time. h.	m.	Def.	Temp.	Distance *a*.	Distance *b*.	P. M. Corrections.		Corrected Sum.
					°	R	R	R	R	R
1904	Nov. 7	7	53	3	27	426.089	?53.544	+0.716	−0.677	779.672
	11	7	14	2	26.5	.097	.542	.712	.674	.677
	Dec. 29	6	48	3–4	20.5	.095	.514	.668	.632	.645
	31	7	29	3	22.5	.108	.522	.667	.631	.666
1905	May 20	16	5	3	44.5	426.254	353.373	+0.539	−0.510	779.656
	21	15	55	3	46.5	.211	.374	.538	.509	.614
	21	16	23	3	46.5	.243	.360	.538	.509	.632
	June 3	15	53	3–4	46.5	.255	.397	.526	.498	.670
	8	15	58	3	47.5	.232	.358	.521	.494	.617
	9	15	20	3	60.5	.239	.347	.521	.493	.614
	9	15	45	3	59	.224	.350	.521	.493	.602
	14	16	49	3	67	.285	.362	.516	.489	.674
	27	16	9	3	56.5	.264	.350	.504	.477	.641
	July 4	15	38	2	68.5	.263	.332	.498	.471	.622
	12	16	1	2	74.5	.287	.328	.490	.464	.641
	12	16	26	2	74.5	.298	.350	.490	.464	.674
1906	Jan. 9	7	21	3–4	8	426.445	353.157	+0.326	−0.307	779.621
	9	7	57	3–4	6	.469	.152	.326	.307	.640
1907	Dec. 19	7	5	1–2	23	427.066*	352.520*	−0.323	+0.305	779.568
	19	7	28	1–2	23	.062*	.527*	.323	.305	.571
	21	7	12	2	22.5	.073*	.509*	.325	.306	.563
	21	7	36	2	22.5	.104*	.539*	.325	.306	.624
	24	8	11	2–3	30	.083*	.518*	.327	.309	.583
	24	8	33	2–3	29.5	.103*	.535*	.327	.309	.620
	26	7	0	2	28	.089*	.535*	.329	.311	.606
	26	7	22	2	29	.085*	.515*	.329	.311	.582
1908	May 25	16	24	2	59.5	427.222*	352.409*	−0.468	+0.440	779.603
	June 2	16	13	2–3	55.5	.217*	.409*	.475	.447	.598
	3	15	38	2–3	58	.226*	.395*	.476	.448	.593
	4	14	42	2	62.5	.226*	.421*	.477	.448	.618
	5	16	23	2	53.5	.219*	.405*	.478	.450	.596
	6	16	34	2–3	52.5	.207*	.393*	.479	.451	.572
	8	14	35	1–2	65	.191*	.376*	.480	.452	.539
	8	15	33	1–2	65	.219*	.405*	.480	.452	.596
	9	15	14	2–3	66	.195*	.375*	.481	.453	.542
	9	15	40	2–3	66	.220*	.407*	.481	.453	.599
	10	14	46	2	66	.230*	.409*	.482	.453	.610
	10	16	7	2	66	.234*	.417*	.482	.453	.622
	11	16	12	2	67	.233*	.401*	.483	.454	.605
	11	16	38	1–2	67	.233*	.398*	.483	.454	.602
	12	16	28	1–2	62.5	.222*	.397*	.484	.456	.591
	12	16	56	1–2	62.5	.226*	.385*	.484	.456	.583
1908	Nov. 28	6	53	2–3	35	427.359*	352.241*	−0.639	+0.601	779.562
	Dec. 1	7	33	3–4	34.5	.396*	.230*	.642	.604	.588
	2	8	10	1–2	18.5	.360*	.233*	.643	.604	.554
	5	7	36	3	16	.374*	.221*	.645	.607	.557
	7	6	50	3	22.5	.372*	.233*	.647	.608	.566
	8	7	47	3	22.5	.367*	.219*	.648	.610	.548
	9	7	9	3–4	19	.382*	.223*	.649	.610	.566
	20	8	0	3–4	26	.396*	.229*	.659	.620	.586
Assumed Annual Proper Motion and Mean Sum:							1905.0:	+0.333	−0.316	779.606
							1909.0:	+0.335	−0.314	

Groom. 1830. — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals. Sol. A.	Residuals. Sol. B.
	R	R	R				R	R	R
S.	72.545	−0.006	73.932	$+1.0\,x_1$	$+1.37\,y$	$-2.15\,z$	+0.032	+0.027	+0.001
	.555	− .007	.934	1.0	1.44	2.14	+ .034	+ .029	+ .003
	.581	− .004	.877	1.0	1.76	2.00	− .023	− .032	− .053
	.586	− .006	.878	1.0	1.75	2.00	− .022	− .031	− .052
S.	72.881	−0.005	73.925	$+1.0\,x_1$	$-1.67\,y$	$-1.62\,z$	+0.025	+0.025	+0.025
	.837	− .001	.883	1.0	1.68	1.61	− .017	− .017	− .017
	.883	− .002	.928	1.0	1.68	1.61	+ .028	+ .028	+ .028
	.858	− .006	.876	1.0	1.80	1.58	− .024	− .024	− .023
	.874	− .001	.888	1.0	1.83	1.56	− .012	− .013	− .010
	.892	− .001	905	1.0	1.83	1.56	+ .005	+ .004	+ .007
	.874	+ .000	.888	1.0	1.83	1.56	− .012	− .013	− .010
	.923	− .006	.922	1.0	1.85	1.55	+ .022	+ .021	+ .024
	.914	− .003	.892	1.0	1.83	1.51	− .008	− .010	− .005
	.931	− .002	.898	1.0	1.78	1.49	− .002	− .004	+ .001
	.959	− .003	.910	1.0	1.69	1.47	+ .010	+ .007	+ .013
	.948	− .006	.896	1.0	1.69	1.47	− .004	− .007	− .001
S.	73.288	−0.001	73.920	$+1.0\,x_1$	$+1.63\,y$	$-0.97\,z$	+0.020	−0.008	+0.017
	.317	− .003	.947	1.0	1.63	0.97	+ .047	+ .019	+ .044
S.	74.546	+0.004	73.922	$+1.0\,x_2$	$+1.80\,y$	$+0.97\,z$	+0.022	−0.005	−0.001
	.535	+ .003	.910	1.0	1.80	0.97	+ .010	− .017	− .013
	.564	+ .004	.937	1.0	1.80	0.97	+ .037	+ .010	+ .014
	.565	− .002	.932	1.0	1.80	0.97	+ .032	+ .005	+ .009
	.565	+ .002	.931	1.0	1.79	0.98	+ .031	+ .004	+ .008
	.568	− .001	.931	1.0	1.79	0.98	+ .031	+ .004	+ .008
	.554	+ .000	.914	1.0	1.78	0.99	+ .014	− .013	− .009
	.570	+ .002	.932	1.0	1.78	0.99	+ .032	+ .005	+ .009
S.	74.813	+0.000	73.905	$+1.0\,x_2$	$-1.73\,y$	$+1.40\,z$	+0.005	+0.012	+0.013
	.808	+ .001	.887	1.0	1.79	1.42	− .013	− .005	− .004
	.831	+ .001	.908	1.0	1.80	1.42	+ .008	+ .016	+ .017
	.805	− .001	.879	1.0	1.81	1.42	− .021	− .012	− .013
	.814	+ .001	.887	1.0	1.81	1.43	− .013	− .004	− .004
	.814	+ .003	.887	1.0	1.82	1.43	− .013	− .004	− .004
	.815	+ .006	.889	1.0	1.83	1.44	− .011	− .002	− .002
	.814	+ .001	.883	1.0	1.83	1.44	− .017	− .008	− .008
	.820	+ .006	.892	1.0	1.83	1.44	− .008	+ .001	+ .001
	.813	+ .001	.880	1.0	1.83	1.44	− .020	− .011	− .010
	.821	− .000	.886	1.0	1.84	1.44	− .014	− .005	− .004
	.817	− .002	.880	1.0	1.84	1.44	− .020	− .011	− .010
	.832	+ .000	.895	1.0	1.84	1.44	− .005	+ .004	+ .005
	.835	+ .000	.898	1.0	1.84	1.44	− .002	+ .007	+ .008
	.825	+ .001	.886	1.0	1.85	1.45	− .014	− .004	− .004
	.841	+ .002	.903	1.0	1.85	1.45	+ .003	+ .013	+ .013
S.	75.118	+0.004	73.882	$+1.0\,x_2''$	$+1.71\,y$	$+1.91\,z$	−0.018	−0.016	−0.017
	.166	+ .002	.922	1.0	1.73	1.92	+ .022	+ .025	+ .023
	.127	+ .005	.885	1.0	1.74	1.92	− .015	− .012	− .014
	.153	+ .005	.906	1.0	1.77	1.93	+ .006	+ .009	+ .007
	.139	+ .004	.888	1.0	1.78	1.93	− .012	− .009	− .010
	.148	+ .006	.896	1.0	1.78	1.94	− .004	− .001	− .002
	.159	+ .004	.904	1.0	1.79	1.94	+ .004	+ .007	+ .006
	.167	+ .002	.890	1.0	1.80	1.97	− .010	− .006	− .008

Assumed Mean Difference: 73.900

Groom. 1830. — *continued.*

Solution A.

				R		R	R	
Normals:	+18.00 x_1	−11.58 y	−28.82 z	= +0.099	*Solution:*	x_1 = +0.0384	±0.0191	Wt. 0.6
	−11.58	+52.81	+16.53	= +0.111		y = +0.0047	±0.0022	43.3
	−28.82	+16.53	+47.89	= −0.135		z = +0.0186	±0.0114	1.7

[*nn*] = 0.00903 [*vv*] = 0.00726 Prob. Error 1 Eq. = ±″0.188

π = +″0.060 ±″0.028

				R		R	R	
Normals:	+32.00 x_2	− 0.07 y	+46.62 z	= +0.027	*Solution:*	x_2 = +0.0465	±0.0055	Wt. 1.6
	− 0.07	+103.61	− 0.52	= +0.613		y = +0.0061	±0.0007	103.5
	+46.62	− 0.52	+70.37	= −0.071		z = −0.0310	±0.0037	3.6

[*nn*] = 0.01019 [*vv*] = 0.00312 Prob. Error 1 Eq. = ±″0.089

π = +″0.078 ±″0.009

Solution B.

					R		R	R	
Normals:	+4.50 x_1	+ 0.00 x_2	− 2.89 y	− 7.20 z	= +0.025	*Solution:*	x_1 = −0.0316	±0.0071	Wt. 1.2
	+0.00	+32.00	− 0.70	+46.22	= +0.027		x_2 = +0.0378	±0.0057	1.9
	−2.89	− 0.70	+116.81	+ 3.61	= +0.641		y = +0.0057	±0.0007	114.9
	−7.20	+46.22	+ 3.61	+82.34	= −0.105		z = −0.0256	±0.0039	4.1

[*nn*] = 0.01245 [*vv*] = 0.00609 Prob. Error 1 Eq. of Wt. 1 = ±″0.099

π = +″0.072 ±″0.009

§ 9. Groombridge 1830. Chase.

The very small parallax for this star found by Smith from his first incomplete series, made it seem desirable that I also take it up with the employment of other comparison stars which will be designated Series II.

After a preliminary determination from the measures of the first two epochs, which also showed a surprisingly small value for the parallax, it seemed wise to add still a third series, using the comparison stars employed by Schlüter and Wichmann in their investigation made some sixty years before. Although nearly at the limit of visibility with our instrument, being of magnitudes 9.2 and 8.9 respectively, according to the Bonn Durchmusterung, it was yet possible to see them fairly well on especially favorable nights, and twelve complete sets were secured near each of the epochs of maximum displacement in November, 1908 and June, 1909.

At first this was deemed sufficient since the effect of proper motion could be well determined by a comparison of my measures with Wichmann. For this purpose position-angle measures were also necessary, and these were secured on four nights about midway between the two epochs at which the distance measures were made. Upon each night the pair of standard stars ξ and ν Ursae Majoris was likewise observed to furnish both the index error and scale value.

A redetermination of all the instrumental constants except μ was also made with the following values: —

$$x = +59'', \; y = -95'', \; i_1 = -58'', \; i' = -33'', \; \beta = 0'',$$

while the value of μ, for which no change was likely, was assumed from previous determinations to be $-80''$.

The position angles at the middle point of each arc corrected for these instrumental constants by the formula given on p. 35, Vol. I, and also for refraction, aberration, and index error are as follows: —

	Groom. 1830 *e*	Groom. 1830 *f*
1909 Mar. 14	274° 36′ 56″	65° 41′ 24″
15	37 41	41 39
18	36 41	40 27
22	37 35	41 23
	Mean: 274° 37′ 13″	65° 41′ 13″

Correcting the observed distances for the proper motion of Groombridge 1830 to March 17, the mean date of the position angle measures, and then calculating the relative places for the comparison stars, I obtained the values: —

For star *e*:	$d\alpha = -39'\ 9.3''$		$d\delta = +2'\ 29.2''$	
For star *f*:	" $= +29'\ 20.0''$		" $= +10\ 22.6$	

referred to 1909.0.

Now WICHMANN'S relative star places given in A. N. 841 when brought up to 1909.0 for precession alone, using STRUVE'S values, give: —

For star *e*:	$d\alpha = -34'\ 1.1''$		$d\delta = -3'\ 10.3''$	
For star *f*:	" $= +34\ 24.1$		" $= +4\ 40.4$	

Hence there are shown the following proper motion effects: —

For distance Groom. 1830 *e*:	$d\alpha = +5'\ 8.2''$		$d\delta = -5'\ 39.5''$	
For distance Groom. 1830 *f*:	" $= -5\ 4.1$		" $= +5\ 42.2$	

Dividing these values by 59.21, the number of years between the mean epochs of WICHMANN'S and my series, reducing to units of scale and resolving along the arc connecting the two stars, we have for the annual proper motion corrections: —

	R
For distance Groom. 1830 *e*:	+0.3571
For distance Groom. 1830 *f*:	−0.1015

which are the values used in the reductions.

For Series II a close value of the proper motion it was thought could be obtained also, since the comparison stars are both found in several of the older as well as more modern catalogues. The arcs Groom. 1830 *c* and Groom. 1830 *d* were first calculated from the star places given in each catalogue, and then assuming the approximate values $+0^s.550$ and $-0^s.550$ for the respective proper motion corrections and carrying back the Yale measures, having regard for the second power of the time, we form the data given in the following table: —

Catalogue.	Star.	Date.	Proper Motion Correction. First Term. R	Second Term. R	Total. R	Distance from Assumed P. M. R	Distance from Catalogue. R
Lalande	*c*	1794.23	−63.12	+0.26	−62.86	228.58	228.64
	d	1794.23	+63.12	+0.09	+63.21	414.60	414.45
Weisse Bessel	*c*	1829.34	−43.81	+0.11	−43.70	247.74	247.56
	d	1828.32	+44.37	+0.05	+44.42	395.81	395.42
Lund	*c*	1880.21	−15.83	+0.02	−15.81	275.63	275.55
	d	1879.32	+16.32	+0.01	+16.33	367.72	367.64
Paris	*c*	1880.3	−15.78	+0.02	−15.76	275.68	275.73
	d	1881.3	+15.23	+0.01	+15.24	366.63	366.47
Yale	*c*	1909.0	0.00	0.00	0.00	291.44	291.44
	d	1909.0	0.00	0.00	0.00	351.39	351.39

Assigning different weights according to the estimated accuracy of the catalogues and number of observations, we have the following equations of condition, normals and solution, in which x represents the necessary correction to the assumed Yale values and y the correction to the assumed proper motion correction per century:—

		R					R	
c:	$+1.00x$	$-1.15y$	$=+0.08$	Wt. ¼	*d*:	$+1.00x$	$-1.15y$	$=-0.15$	Wt. ¼
	$+1.00$	-0.80	$=-0.18$	½		$+1.00$	-0.81	$=-0.39$	½
	$+1.00$	-0.29	$=-0.08$	1		$+1.00$	-0.29	$=-0.08$	1
	$+1.00$	-0.29	$=+0.05$	1		$+1.00$	-0.28	$=-0.16$	1
	$+1.00$	$+0.00$	$=+0.00$	10		$+1.00$	$+0.00$	$=+0.00$	10

			R			R
Normals:	$+12.75x$	$-1.27y$	$=-0.105$		$+12.75x$	$-1.26y$	$=-0.473$
	-1.27	$+0.818$	$=+0.064$		-1.26	$+0.821$	$=+0.269$
			R			R
			$y=+0.078$			$y=+0.319$

Thus the more correct values of the annual proper motion correction would be $+0^{R}.5508$ and $-0^{R}.5468$. I have adopted $+0^{R}.551$ and $-0^{R}.547$ in the reductions.

The discontinuity, which meanwhile had become apparent in SMITH's work in January, 1909, made it seem advisable to add measures to both my series during another epoch, to test its reality and, if real, eliminate its effect. Three different solutions were then made for Series II and two for Series III, in the first of which two quantities x_1 and x_2 were introduced with z assumed equal to zero, and the last for each series made in the usual manner introducing z.

The data follow:—

Groombridge 1830	B. D. +38°, 2285	Mag. 6.5	R. A. 11h 45.9m	Decl. +38° 35′	Pos. Angle.
c	+39°, 2471	7.8	11 42.6	39 36	334°.4
d	+37°, 2230	6.5	11 47.7	37 35	153°.4

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Apr. 21	15 39	3–4	34.5	291.047	351.770	+0.382	−0.380	642.819
21	16 25	3–4	34.5	.058	.775	.382	.380	.835
23	15 34	2	51	.080	.777	.380	.377	.860
23	16 12	2	50	.056	.767	.380	.377	.826
26	15 40	3	54	.099	.787	.375	.373	.888
26	16 22	3	52.5	.078	.787	.375	.373	.867

Groom. 1830. — *continued.*

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Nov. 1	6 59	3–4	27.5	291.340	351.455	+0.090	−0.089	642.796
1	7 42	3–4	27.5	.352	.453	.090	.089	.806
5	7 0	3	27	.380	.483	.084	.083	.864
5	7 40	3	27.5	.352	.469	.084	.083	.822
12	6 55	3	31	.376	.455	.073	.073	.831
12	7 35	3	30.5	.380	.463	.073	.073	.843
13	6 52	3	28	.411	.480	.072	.071	.892
13	7 29	3	27	.370	.456	.072	.071	.827
20	7 9	2–3	28	.368	.428	.061	.061	.796
20	7 47	2–3	26.5	.373	.431	.061	.061	.804
22	7 13	1–2	37.5	.380	.433	.059	.058	.814
22	8 6	1–2	38	.355	.430	.059	.058	.786
1909 Apr. 17	15 55	3	47	291.598	351.230	−0.162	+0.161	642.827
17	16 37	3	45.5	.599	.237	.162	.161	.835
23	15 1	2	36.5	.611	.233	.171	.170	.843
23	15 41	2	36	.607	.232	.171	.170	.838
24	16 1	3–4	34	.606	.225	.172	.171	.830
26	15 0	3–4	35	.601	.236	.175	.174	.836
26	15 33	3–4	34.5	.603	.236	.175	.174	.838
1909 Nov. 5	7 19	3	31	291.913	350.912	−0.467	+0.463	642.821
5	7 54	3	31	.916	.919	.467	.463	.831
6	7 26	3–4	30.5	.903	.919	.468	.465	.819
6	8 6	3–4	30.5	.888	.924	.468	.465	.809
9	7 30	3–4	27.5	.901	.905	.473	.469	.802
11	7 32	3–4	46	.910	.909	.475	.472	.816
11	8 12	3–4	46	.935	.907	.475	.472	.839
12	7 28	2–3	57	.933	.903	.477	.474	.833
12	8 3	2–3	57	.915	.913	.477	.474	.825
26	7 29	3	30.5	.914	.884	.498	.494	.794
26	8 12	3	30	.913	.876	.498	.494	.785
29	7 51	3	26.5	.962	.884	.503	.499	.842
				Assumed Annual Proper Motion and Mean Sum:		+0.551	−0.547	642.830

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. Sols. B and C R
C.	60.723	+0.001	59.962	$+1.0\,x_1$	$+1.69\,y_1$	$-0.69\,z$	= +0.017	+0.008
	.717	− .001	.954	1.0	1.69	0.69	+ .009	+ .000
	.697	− .003	.937	1.0	1.71	0.69	− .008	− .017
	.711	+ .000	.954	1.0	1.71	0.69	+ .009	− .000
	.688	− .006	.934	1.0	1.74	0.68	− .011	− .020
	.709	− .004	.957	1.0	1.74	0.68	+ .012	+ .003
C.	60.115	+0.003	59.939	$+1.0\,x_1$	$-1.72\,y_1$	$-0.16\,z$	= −0.006	+0.003
	.101	+ .002	.924	1.0	1.72	0.16	− .021	− .012
	.103	− .003	.933	1.0	1.73	0.15	− .012	− .003
	.117	+ .001	.951	1.0	1.73	0.15	+ .006	+ .015
	.079	− .000	.933	1.0	1.72	0.13	− .012	− .003
	.083	− .001	.936	1.0	1.72	0.13	− .009	+ .000
	.069	− .006	.920	1.0	1.72	0.13	− .025	− .016
	.086	+ .000	.943	1.0	1.72	0.13	− .002	+ .007
	.060	+ .003	.941	1.0	1.69	0.11	− .004	+ .005
	.058	+ .002	.938	1.0	1.69	0.11	− .007	+ .002
	.053	+ .002	.938	1.0	1.68	0.11	− .007	+ .002
	.075	+ .004	.962	1.0	1.68	0.11	+ .017	+ .026
C.	59.632	+0.000	59.955	$+1.0\,x_2$	$+1.64\,y_2$	$+0.29\,z$	= +0.010	−0.008
	.638	− .000	.961	1.0	1.64	0.29	+ .016	− .002

Groom. 1830. — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. Sols. B and C. R
C.	59.622	−0.001	59.962	$+1.0\,x_2$	$+1.70\,y_2$	$+0.31\,z$	$= +0.017$	−0.001
	.625	− .001	.965	1.0	1.70	0.31	+ .020	+ .002
	.619	+ .000	.962	1.0	1.71	0.31	+ .017	− .001
	.635	− .001	.983	1.0	1.74	0.32	+ .038	+ .020
	.633	− .001	.981	1.0	1.74	0.32	+ .036	+ .017
C.	58.999	+0.001	59.930	$+1.0\,x_2$	$-1.73\,y_2$	$+0.85\,z$	$= -0.015$	−0.015
	59.003	− .000	.933	1.0	1.73	0.85	− .012	− .012
	.016	+ .001	.950	1.0	1.73	0.85	+ .005	+ .005
	.036	+ .002	.971	1.0	1.73	0.85	+ .026	+ .026
	.004	+ .003	.949	1.0	1.73	0.86	+ .004	+ .004
	58.999	+ .001	.947	1.0	1.72	0.86	+ .002	+ .002
	.972	− .001	.918	1.0	1.72	0.86	− .027	− .027
	.970	− .000	.921	1.0	1.72	0.87	− .024	− .024
	.998	+ .000	.949	1.0	1.72	0.87	+ .004	+ .004
	.970	+ .003	.965	1.0	1.66	0.90	+ .020	+ .020
	.963	+ .004	.959	1.0	1.66	0.90	+ .014	+ .014
	.922	− .001	.923	1.0	1.63	0.91	− .022	− .022

Assumed Mean Difference: 59.945

Normals:

				R	
$+18.00\,x_1$	$+\ 0.00\,x_2$	$-10.24\,y_1$	$+\ 0.00\,y_2$	$-\ 5.70\,z$	$= -0.054$
+ 0.00	+19.00	+ 0.00	− 8.61	+12.58	= +0.129
−10.24	+ 0.00	+52.72	+ 0.00	− 4.36	= +0.1885
+ 0.00	− 8.61	+ 0.00	+55.11	−14.12	= +0.306
− 5.70	+12.58	− 4.36	−14.12	+12.77	= +0.019

$[nn] = 0.01026$

Solution A

	R	R	
$x_1 =$	$-0.0011 \quad +0.410\,z$	±0.0023	Wt. 16.02
$x_2 =$	$+0.0100 \quad -0.592\,z$	±0.0022	17.66
$y_1 =$	$+0.0034 \quad +0.162\,z$	±0.0013	46.90
$y_2 =$	$+0.0071 \quad +0.165\,z$	±0.0013	51.21

$[vv] = 0.00593$ Prob. Error 1 Eq. = ±0.″115

Solution B

	R	R	
$x_1 =$	+0.0000	±0.0022	Wt. 16.99
$x_2 =$	+0.0090	±0.0022	18.27
$y =$	+0.0053	±0.0009	98.11

$[vv] = 0.00642$ Prob. Error 1 Eq. = ±0.″117

$\pi = +0.''067 \quad \pm 0.''012$

Solution C

	R	R	
$x =$	+0.0039	±0.0016	Wt. 32.32
$y =$	+0.0068	±0.0010	78.70
$z =$	+0.0093	±0.0030	9.20

$[vv] = 0.00642$ Prob. Error 1 Eq. = ±0.″117

$\pi = +0.''086 \quad \pm 0.''013$

The agreement of the values of y in *Solution A* is sufficiently satisfactory to warrant the adoption of *Solution B* in its stead. While the considerable difference in the values of x_1 and x_2 in the latter seems to corroborate the discontinuity before referred to, it might be explained by an error in the assumed proper motion correction as appears from *Solution C*. The best value to be derived from the above data we consider to be the mean of *Solutions B* and *C*, viz.:—

$$\pi = +0.''076 \quad \pm 0.''012$$

Groombridge 1830	B.D. +38°, 2285	Mag. 6.5	R. A. 11h 45.9m	Decl. 38° 35′	Pos. Angle.
e	+38°, 2283	9.2	11 42.3	38 42	274°.6
f	+38°, 2289	8.9	11 46.9	38 51	65°.7

Date.		Sid. Time.	Def.	Temp.	Distance *e*. R	Distance *f*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1908	Dec. 23	7 29	2	11.5	145.647	119.301	+0.007	−0.002	264.953
	23	8 9	2	12	.636	.314	+ .007	− .002	.955
	27	7 43	3	34	.610	.311	+ .004	− .001	.924
	27	8 24	3	33	.606	.314	+ .004	− .001	.923
	29	7 35	3	27.5	.634	.295	+ .002	− .001	.930
	29	8 13	3	27.5	.613	.288	+ .002	− .001	.902
1909	Jan. 1	7 25	2	17.5	.616	.310	− .001	+ .000	.925
	1	7 58	2	18.0	.628	.294	− .001	+ .000	.921
	12	8 3	1	17.5	.642	.277	− .012	+ .003	.910
	12	8 38	1	17	.589	.285	− .012	+ .003	.865
	22	8 14	2	36	.654	.282	− .022	+ .006	.920
	22	8 49	2	35	.649	.288	− .022	+ .006	.921
1909	May 4	15 34	3–4	44	145.736	119.283	−0.121	+0.034	264.932
	4	16 28	3	44	.728	.284	.121	.034	.925
	8	15 48	3–4	46.5	.757	.288	.125	.036	.956
	8	16 22	3	46	.738	.280	.125	.036	.929
	11	15 33	2–3	47	.726	.238	.128	.036	.872
	11	16 12	2–3	46.5	.757	.248	.128	.036	.913
	12	15 41	2–3	56.5	.728	.257	.129	.037	.893
	12	16 20	2–3	56	.715	.242	.129	.037	.865
	23	16 43	3–4	48.5	.762	.279	.140	.040	.941
	25	16 6	1–2	47	.738	.246	.142	.040	.882
	25	16 43	1–2	46	.750	.257	.142	.040	.905
	29	15 34	2	56	.756	.262	.146	.041	.913
	29	16 10	2	55.5	.745	.265	.146	.041	.905
	29	16 47	2	55	.764	.264	.146	.041	.923
	30	15 39	2	57.5	.731	.248	.147	.042	.874
	30	16 13	2	57	.741	.245	.147	.042	.881
1909	Dec. 19	8 14	2–3	19.5	145.964	119.184	−0.345	+0.098	264.901
	19	8 50	2–3	18.5	.959	.168	.345	.098	.880
	20	7 30	2–3	16	.953	.168	.346	.098	.873
	20	8 7	2–3	15.5	.955	.203	.346	.098	.910
1910	Jan. 10	8 9	2–3	13.5	.972	.174	.367	.104	.883
	10	8 47	2–3	13.5	.947	.188	.367	.104	.872
	16	7 32	2	21.5	.987	.195	.373	.106	.915
	16	8 8	2	22	.974	.203	.373	.106	.910
	19	7 56	3–4	26	.990	.187	.376	.107	.908
	19	8 33	3–4	25	.996	.174	.376	.107	.901
						Assumed Annual Proper Motion and Mean Sum:	+0.3571	−0.1015	264.930

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	26.346	−0.002	26.353	$+1.0\,x_1 + 1.62\,y - 0.02\,z =$	+0.033	+0.026
	.322	− .002	.329	1.0 1.62 −0.02	+ .009	+ .002
	.299	+ .001	.305	1.0 1.62 −0.01	− .015	− .022
	.292	+ .001	.298	1.0 1.62 −0.01	− .022	− .029
	.339	+ .000	.342	1.0 1.61 −0.00	+ .022	+ .015
	.325	+ .003	.331	1.0 1.61 −0.00	+ .011	+ .004
	.306	+ .000	.305	1.0 1.60 +0.00	− .015	− .022
	.334	+ .001	.334	1.0 1.60 +0.00	+ .014	+ .007
	.365	+ .002	.352	1.0 1.53 +0.03	+ .032	+ .025
	.304	+ .006	.295	1.0 1.53 +0.03	− .025	− .032
	.372	+ .001	.345	1.0 1.41 +0.06	+ .025	+ .019
	.361	+ .001	.334	1.0 1.41 +0.06	+ .014	+ .008

Groom. 1830. — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	26.453	−0.000	26.298	$+1.0\,x_2$	$-1.11\,y$	$+0.34\,z$	$=-0.022$	−0.013
	.444	+ .000	.289	1.0	1.11	0.34	− .031	− .022
	.469	− .003	.305	1.0	1.19	0.35	− .015	− .005
	.458	+ .000	.297	1.0	1.19	0.35	− .023	− .013
	.488	+ .006	.330	1.0	1.25	0.36	+ .010	+ .020
	.509	+ .002	.347	1.0	1.25	0.36	+ .027	+ .037
	.471	+ .004	.309	1.0	1.26	0.36	− .011	− .001
	.473	+ .006	.313	1.0	1.26	0.36	− .007	+ .003
	.483	− .001	.302	1.0	1.44	0.39	− .018	− .007
	.492	+ .005	.315	1.0	1.47	0.40	− .005	+ .006
	.493	+ .002	.313	1.0	1.47	0.40	− .007	+ .004
	.494	+ .002	.309	1.0	1.51	0.41	− .011	+ .001
	.480	+ .002	.295	1.0	1.51	0.41	− .025	− .013
	.500	+ .001	.314	1.0	1.51	0.41	− .006	+ .006
	.483	+ .006	.300	1.0	1.52	0.41	− .020	− .008
	.496	+ .005	.312	1.0	1.52	0.41	− .008	+ .004
C.	26.780	+0.003	26.340	$+1.0\,x_2$	$+1.61\,y$	$+0.97\,z$	$=+0.020$	+0.015
	.791	+ .005	.353	1.0	1.61	0.97	+ .033	+ .028
	.785	+ .006	.347	1.0	1.62	0.97	+ .027	+ .022
	.752	+ .002	.310	1.0	1.62	0.97	− .010	− .015
	.798	+ .005	.332	1.0	1.54	1.03	+ .012	+ .007
	.759	+ .006	.294	1.0	1.54	1.03	− .026	− .031
	.792	+ .002	.315	1.0	1.49	1.04	− .005	− .009
	.771	+ .002	.294	1.0	1.49	1.04	− .026	− .030
	.803	+ .002	.322	1.0	1.46	1.05	+ .002	− .002
	.822	+ .003	.342	1.0	1.46	1.05	+ .022	+ .018

Assumed Mean Difference: 26.320

Normals:

				R	
$+12.00\,x_1$	$+\ 0.00\,x_2$	$+18.78\,y$	$+\ 0.12\,z$	$=+0.085$	
$+\ 0.00$	$+26.00$	$-\ 6.13$	$+16.18$	$=-0.123$	
$+18.78$	$-\ 6.13$	$+82.73$	$+\ 7.52$	$=+0.436$	
$+\ 0.12$	$+16.18$	$+\ 7.52$	$+12.56$	$=-0.163$	$[nn] = 0.01454$

Solution A

	R		R	
$x_1 =$	-0.0013	$+0.326\,z$	± 0.0044	Wt. 7.66
$x_2 =$	-0.0035	$-0.673\,z$	± 0.0024	25.30
$y =$	$+0.0053$	$-0.215\,z$	± 0.0017	51.89

$[vv] = 0.01181$ Prob. Error 1 Eq. = $\pm 0''.157$

$\pi = +0''.067 \quad \pm 0''.022$

Solution B

	R	R	
$x =$	-0.0020	± 0.0029	Wt. 16.75
$y =$	$+0.0058$	± 0.0014	77.73
$z =$	-0.0021	± 0.0052	5.51

$[vv] = 0.01181$ Prob. Error 1 Eq. = $\pm 0''.157$

$\pi = +0''.073 \quad \pm 0''.018$

The agreement of the values x_1 and x_2 does not confirm the assumption of any discontinuity for this series in January, 1909, and the value of z comes out very small. Still as in Series II the mean of the two solutions is adopted, viz: —

$$\pi = +0''.070 \quad \pm 0''.020$$

Thus my two results for this star are: —

C. Series II:	$\pi = +0''.077$	$\pm 0''.012$	Wt. 88.4	Prob. Error 1 Obs.	$\pm 0''.117$ 37 Obs.
C. " III:	$\pi = +0.070$	± 0.020	64.8		$\pm 0''.157$ 38

from which by combining we get by

$$\begin{array}{lll} \text{Method } \alpha: & \pi = +0''.0735 & \pm 0''.0098 \\ \text{“ } \beta: & \pi = +0.0739 & \pm 0.0110 \\ \text{“ } \gamma: & \pi = +0.0746 & \pm 0.0112 \end{array}$$

whose mean is the adopted value

$$\pi = +0''.074 \quad \pm 0''.011$$

§ 10. Groombridge 1830 — Final Value.

In combining the several series, account has to be taken in Smith's Series I of the assumed systematic error for him. The results for the two observers then are: —

Smith, Series I:	$\pi = +0''.072$	$\pm 0''.013$	Wt. 114.9	Prob. Error 1 Obs. $\pm 0''.099$	50 Obs.
Chase, “ II and III:	$\pi = +0.074$	± 0.011	153.6	± 0.137	75

These combined give: —

$$\begin{array}{lll} \text{Method } \alpha: & \pi = +0''.073 & \pm 0''.012 \\ \text{“ } \beta: & \pi = +0.073 & \pm 0.007 \\ \text{“ } \gamma: & \pi = +0.073 & \pm 0.007 \end{array}$$

the mean of which is our final value: —

Groombridge 1830: $\pi = +0''.073 \quad \pm 0''.009$

§ 11. σ Draconis. Smith.

This star with the considerable proper motion of 1″.8 has already been the object of parallax research by Brünnow and Peter with the respective results of + 0″.24 and + 0″.17. It appeared, however, worth while to add another series with the Yale Heliometer, the outcome of which seems to assure the parallax to be about 0″.2.

The complete data are as follows: —

σ Draconis	B. D. +69°, 1053	Mag. 5.0	R. A. $19^h\ 32.6^m$	Decl. +69° 25′	Pos. Angle.
a	+69°, 1036	8.1	19 12.9	69 27	271°.5
b	+69°, 1069	8.0	19 46.4	69 34	81°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1905 Oct.	7	23 40	3	44.5	494.558	344.713	+0.017	−0.003	839.285
	8	23 45	3–4	55.5	.519	.702	.017	.003	.235
	29	1 20	3	34.5	.530	.714	.012	.002	.254
	30	2 12	3	35.5	.566	.702	.012	.002	.278
Nov.	1	2 21	3	26.5	.560	.704	.012	.002	.274
	2	1 35	3–4	32.5	.524	.709	.012	.002	.243

σ **Draconis** — *continued.*

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance α. R	Distance δ. R	P. M. Corrections. R	R	Corrected Sum. R
1906	Apr. 16	14	9	3	53.5	494.598	344.672	−0.021	+0.004	839.253
	18	13	21	3	52	.669	.688	.022	.004	.339
	22	13	31	3–4	46.5	.628	.665	.023	.004	.274
	26	13	21	3–4	50	.609	.670	.023	.004	.260
	27	12	55	2	50	.625	.671	.023	.004	.277
	28	14	13	2	49.5	.623	.671	.024	.004	.274
	May 1	13	57	3	51.5	.625	.675	.024	.004	.280
	2	14	22	3–4	50	.642	.661	.025	.004	.282
	4	13	31	2–3	50.5	.624	.681	.025	.004	.284
1906	Sept. 21	1	49	2–3	50.5	494.603	344.671	−0.053	+0.009	839.230
	25	1	4	2–3	50.5	.568	.681	.054	.010	.205
	27	1	51	4	56	.609	.684	.054	.010	.249
	Oct. 7	2	25	3	42.5	.639	.722	.056	.010	.315
	8	0	45	2–3	52.5	.622	.690	.056	.010	.266
	11	2	54	3–4	34.5	.630	.724	.057	.010	.307
	Assumed Annual Proper Motion and Mean Sum:							+0.073	−0.013	839.270

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	150.845	−0.003	150.862	$+1.0\,x$	$-1.91\,y$	$-0.23\,z$	$=-0.028$	+0.010
	.817	+ .006	.843	1.0	1.92	0.23	− .047	− .009
	.816	+ .003	.833	1.0	1.88	0.17	− .057	− .020
	.864	− .001	.877	1.0	1.87	0.17	− .013	+ .024
	.856	− .001	.869	1.0	1.86	0.16	− .021	+ .016
	.815	+ .005	.834	1.0	1.85	0.16	− .056	− .019
S.	150.926	+0.003	150.904	$+1.0\,x$	$+1.96\,y$	$+0.29\,z$	$=+0.014$	−0.022
	.981	− .012	.943	1.0	1.97	0.30	+ .053	+ .017
	.963	− .001	.935	1.0	1.95	0.31	+ .045	+ .009
	.939	+ .002	.914	1.0	1.91	0.32	+ .024	− .011
	.954	− .001	.926	1.0	1.91	0.32	+ .036	+ .001
	.952	− .001	.923	1.0	1.90	0.33	+ .033	− .002
	.950	− .002	.920	1.0	1.87	0.33	+ .030	− .004
	.981	− .002	.950	1.0	1.86	0.34	+ .060	+ .026
	.943	− .003	.911	1.0	1.84	0.34	+ .021	− .013
S.	150.932	+0.007	150.877	$+1.0\,x$	$-1.77\,y$	$+0.73\,z$	$=-0.013$	+0.022
	.887	+ .012	.835	1.0	1.83	0.74	− .055	− .019
	.925	+ .004	.865	1.0	1.85	0.74	− .025	+ .011
	.917	− .008	.843	1.0	1.91	0.77	− .047	− .009
	.932	+ .001	.867	1.0	1.92	0.77	− .023	+ .015
	.906	− .007	.832	1.0	1.92	0.78	− .058	− .020
	Assumed Mean Difference:		150.890					

Normals: R

$+21.00\,x - 5.32\,y + 6.29\,z = -0.127$

$-5.32 + 74.96 - 0.86 = +1.436$

$+6.29 - 0.86 + 4.57 = -0.025$

Solution:

	R	R	
$x =$	−0.0012	±0.0031	Wt. 12.1
$y =$	+0.0191	±0.0013	73.4
$z =$	−0.0000	±0.0066	2.7

$[nn] = 0.03283$ $[vv] = 0.00529$ Prob. Error 1 Eq. = $\pm 0''.139$

$\pi = +0''.243 \pm 0''.016$

Taking account of the adopted systematic error we have the final result: —

σ Draconis: $\pi = +0''.243 \pm 0''.018$

§ 12. Lalande 21185. Chase.

This star was shown by Argelander as early as 1857 to have an enormous proper motion, ranking in this respect next to 1830 Groombridge and 61 Cygni, among all the stars of the northern heavens. Naturally it was one of the first to be investigated for parallax, Winnecke doing so with the Bonn Heliometer, and in 1858 he published as a preliminary value, $\pi = +0.''51 \pm 0.''015$. In 1872 he published as his final result, $\pi = +0''.501 \pm 0''.011$.

Kapteyn in 1891, by his meridian-circle method, derived the value $\pi = +0''.43 \pm 0''.028$. Flint, following Kapteyn's method in 1895, found $\pi = +0''.37 \pm 0''.047$. Jost in 1901, by the same method from four different comparison stars, got values ranging from $+0''.31$ to $+0''.40$ with a mean value $\pi = +0''.36 \pm 0''.023$. Finally Russell in 1905, by the photographic method, reached the result $\pi = +0''.344 \pm 0''.013$.

The considerably smaller and decreasing values found by the later investigators by the meridian and photographic methods made it seem desirable to add the evidence of a determination with a modern heliometer. Accordingly I selected two pairs of comparison stars and carried out the two series for which the data are given below:—

Lalande 21185	B. D. +36°, 2147	Mag. 7.3	R. A. $10^h\ 55.4^m$	Decl. +36° 56′	Pos. Angle.
a	+37°, 2139	8.3	10 50.3	37 48	312°.4
b	+36°, 2160	7.5	11 2.2	36 7	118°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 May 12	15 43	3	39	388.6794 *	447.2366 *	+0.141	−0.091	835.966
14	14 16	3–4	54.5	.6834 *	.2256 *	.140	.090	.959
20	14 40	1–2	43.5	.6874 *	.2236 *	.136	.087	.960
21	15 34	3–4	38	.7164 *	.2486 *	.136	.087	836.014
28	14 49	3	43.5	.7034 *	.2276 *	.131	.084	835.978
30	15 31	2	48.5	.6934 *	.2196 *	.130	.083	.960
31	15 36	2–3	46	.7194 *	.2476 *	.129	.083	836.013
June 3	15 46	2	50	.6794 *	.2316 *	.128	.082	835.957
1907 Oct. 30	6 14	2–3	30.5	388.8214 *	447.0676 *	+0.038	−0.024	835.903
31	6 48	3	32	.811	.080	.037	.024	.904
Nov. 4	5 53	3–4	30	.822	.089	.035	.022	.924
11	6 49	3–4	30	.838	.062	.031	.020	.911
11	7 37	3–4	29.5	.821	.074	.031	.020	.906
13	6 6	2–3	29	.841	.080	.029	.019	.931
13	7 24	2–3	29	.828	.069	.029	.019	.907
14	6 59	2	23	.838	.061	.029	.018	.910
16	6 57	2	31.5	.852	.075	.028	.018	.937
19	5 31	2–3	34	.864	.064	.026	.016	.938
25	6 55	3	28.5	.854	.070	.022	.014	.932
25	8 9	3	27.5	.822	.090	.022	.014	.920
29	6 38	2–3	28.5	.843	.093	.020	.013	.943
29	7 51	2	27.5	.847	.094	.020	.013	.948
Dec. 1	6 21	3–4	22	.855	.093	.019	.012	.955
7	7 12	3	29.5	.854	.077	.015	.010	.936
1908 May 10	15 22	3–4	41	388.940	447.108	−0.079	+0.050	836.019
17	15 11	2–3	60	.913	.104	.083	.053	835.987

Lalande 21185 — *continued.*

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 May 18	14 11	3–4	55	388.923	447.102	−0.083	+0.053	835.995
24	14 58	2–3	69	.928	.107	.087	.056	836.004
24	15 42	3–4	67.5	.963	.127	.087	.056	.059
27	14 28	3–4	71	.930	.106	.088	.057	.005
27	15 9	3–4	70.5	.938	.093	.088	.057	.000
June 1	15 50	2–3	55	.924	.109	.092	.059	.000
Assumed Annual Proper Motion and Mean Sum:						+0.220	−0.141	835.960

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	58.5572	−0.0004	58.3248	+1.0 x	+1.97 y	−0.64 z =	+0.0698	+0.0082
	.5422	+ .0001	.3123	1.0	1.98	0.64	+ .0573	− .0046
	.5362	+ .0000	.3132	1.0	1.98	0.62	+ .0582	− .0036
	.5322	− .0038	.3054	1.0	1.98	0.62	+ .0504	− .0114
	.5242	− .0013	.3079	1.0	1.95	0.60	+ .0529	− .0079
	.5262	+ .0000	.3132	1.0	1.94	0.59	+ .0582	− .0023
	.5282	− .0037	.3125	1.0	1.94	0.59	+ .0575	− .0030
	.5522	+ .0002	.3424	1.0	1.91	0.58	+ .0874	+ .0278
C.	58.2462	+0.0040	58.1882	+1.0 x	−1.83 y	−0.17 z =	−0.0668	−0.0116
	.269	+ .0039	.2119	1.0	1.85	0.17	− .0431	+ .0128
	.267	+ .0025	.2125	1.0	1.88	0.16	− .0425	+ .0143
	.224	+ .0034	.1764	1.0	1.92	0.14	− .0786	− .0208
	.253	+ .0038	.2058	1.0	1.92	0.14	− .0492	+ .0089
	.239	+ .0020	.1930	1.0	1.93	0.14	− .0620	− .0036
	.241	+ .0037	.1967	1.0	1.93	0.14	− .0583	+ .0001
	.223	+ .0035	.1795	1.0	1.93	0.13	− .0755	− .0171
	.223	+ .0016	.1786	1.0	1.93	0.13	− .0764	− .0180
	.200	+ .0015	.1595	1.0	1.93	0.12	− .0955	− .0370
	.216	+ .0019	.1819	1.0	1.92	0.10	− .0731	− .0149
	.268	+ .0028	.2348	1.0	1.92	0.10	− .0202	+ .0380
	.250	+ .0012	.2182	1.0	1.90	0.09	− .0368	+ .0209
	.247	+ .0008	.2148	1.0	1.90	0.09	− .0402	+ .0175
	.238	+ .0003	.2073	1.0	1.89	0.09	− .0477	+ .0097
	.223	+ .0017	.1997	1.0	1.83	0.07	− 0553	+ .0002
C.	58.168	−0.0041	58.2929	+1.0 x	+1.97 y	+0.36 z =	+0.0379	−0.0201
	.191	− .0019	.3251	1.0	1.99	0.38	+ .0701	+ .0116
	.179	− .0024	.3126	1.0	1.99	0.38	+ .0576	− .0009
	.179	− .0031	.3189	1.0	1.97	0.39	+ .0639	+ .0060
	.164	− .0069	.3001	1.0	1.97	0.39	+ .0451	− .0128
	.176	− .0031	.3179	1.0	1.95	0.40	+ .0629	+ .0056
	.155	− .0028	.2972	1.0	1.95	0.40	+ .0422	− .0151
	.185	− .0028	.3332	1.0	1.92	0.42	+ .0782	+ .0219
Assumed Mean Difference:			58.2550					

Normals:

			R
+32.00 x	+ 0.95 y	−3.74 z =	+0.0284
+ 0.95	+119.27	+0.34 =	+3.6121
− 3.74	+ 0.34	+4.46 =	−0.0042

Solution:

	R	R	
x =	−0.0004	±0.0021	Wt. 28.85
y =	+0.0303	±0.0010	119.19
z =	−0.0036	±0.0056	3.99

$[nn] = 0.11753$ $[vv] = 0.00806$ Prob. Error 1 Eq. = ±″0.143

π = +″0.385 ±″0.013

Lalande 21185	B. D. +36°, 2147	Mag. 7.3	R. A. $10^h\ 55.4^m$	Decl. +36° 56′	Pos. Angle.
c	+37°, 2140	8.5	10 51.4	37 18	298°.3
d	+36°, 2157	7.4	11 0.6	36 46	94°.4

	Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	May 14	14	58	3–4	53.5	254.4025 *	298.6378 *	+0.090	+0.008	553.138
	20	15	18	2–3	43	.3825 *	.6388 *	.087	.008	.116
	21	14	46	3–4	39	.3855 *	.6318 *	.087	.008	.112
	28	15	26	3	42	.3825 *	.6428 *	.084	.008	.117
	30	14	55	2.	50	.3685 *	.6268 *	.083	.008	.086
	31	14	55	2–3	46	.3835 *	.6498 *	.083	.008	.124
	June 3	15	6	2	50	.3795 *	.6268 *	.082	.008	.096
	16	15	41	2	67	.3965 *	.6358 *	.077	.007	.116
1907	Oct. 30	6	56	2–3	30.5	254.4775 *	298.5898 *	+0.024	+0.002	553.093
	30	7	39	2–3	30	.4795 *	.5658 *	.024	.002	.071
	31	6	12	3	33	.487	.577	.024	.002	.090
	Nov. 4	6	33	3–4	29.5	.506	.582	.022	.002	.112
	11	6	5	3–4	30	.503	.560	.020	.002	.085
	13	6	48	2–3	29	.510	.581	.019	.002	.112
	14	6	13	2	23.5	.518	.578	.018	.002	.116
	16	6	17	2	32	.483	.572	.018	.002	.075
	16	7	37	2	31	.501	.573	.018	.002	.094
	19	7	7	2–3	34	.496	.567	.016	.002	.081
	19	7	47	1–2	33.5	.507	.578	.016	.002	.103
	25	7	34	3	28	.517	.581	.014	.001	.113
	29	7	15	2–3	28	.522	.574	.013	.001	.110
	Dec. 7	6	25	3	29	.528	.618	.010	.001	.157
	7	7	52	3	30	.516	.581	.010	.001	.108
1908	May 17	15	51	2–3	57.5	254.538	298.662	−0.053	−0.005	553.142
	18	14	54	3–4	54	.521	.658	.053	.005	.121
	18	15	32	3–4	53	.503	.674	.053	.005	.119
	24	14	21	2	70	.547	.650	.056	.005	.136
	27	15	58	3–4	70	.528	.668	.057	.005	.134
	June 1	14	28	2–3	57	.544	.666	.059	.005	.146
	1	15	8	2–3	56	.534	.651	.059	.005	.121
	2	14	36	2	58	.518	.668	.059	.005	.122
						Assumed Annual Proper Motion and Mean Sum:		+0.141	+0.013	553.110

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	44.2353	−0.0022	44.1511	+1.0 *x*	+1.92 *y*	−0.64 *z*	= +0.0311	−0.0230
	.2563	− .0005	.1768	1.0	1.95	0.62	+ .0568	+ .0016
	.2463	− .0002	.1671	1.0	1.95	0.62	+ .0471	− .0081
	.2603	− .0006	.1837	1.0	1.96	0.60	+ .0637	+ .0081
	.2583	+ .0019	.1852	1.0	1.96	0.59	+ .0652	+ .0093
	.2663	− .0011	.1902	1.0	1.96	0.59	+ .0702	+ .0145
	.2473	+ .0011	.1744	1.0	1.95	0.58	+ .0544	− .0011
	.2393	− .0005	.1688	1.0	1.84	0.55	+ .0488	− .0035
C.	44.1123	+0.0013	44.0916	+1.0 *x*	−1.69 *y*	−0.17 *z*	= −0.0284	+0.0277
	.0863	+ .0031	.0672	1.0	1.69	0.17	− .0528	+ .0033
	.090	+ .0016	.0696	1.0	1.71	0.17	− .0504	+ .0064
	.076	− .0002	.0558	1.0	1.76	0.16	− .0642	− .0062
	.057	+ .0020	.0410	1.0	1.84	0.14	− .0790	− .0184
	.071	− .0002	.0538	1.0	1.85	0.14	− .0662	− .0053
	.060	− .0005	.0435	1.0	1.86	0.13	− .0765	− .0153
	.089	+ .0028	.0758	1.0	1.87	0.13	− .0442	+ .0173
	.072	+ .0013	.0573	1.0	1.87	0.13	− .0627	− .0012
	.071	+ .0023	.0593	1.0	1.89	0.12	− .0607	+ .0011

Lalande 21185 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.	Residuals.
	R	R	R	R	R
C	4.071	+0.0006	44.0576	$+1.0x - 1.89y - 0.12z = -0.0624$	−0.0004
	.064	− .0002	.0508	1.0 1.91 0.10 − .0692	− .0067
	.052	+ .0000	.0400	1.0 1.91 0.09 − .0800	− .0175
	.090	− .0037	.0773	1.0 1.88 0.07 − .0427	+ .0186
	.065	+ .0002	.0562	1.0 1.88 0.07 − .0638	− .0025
C.	44.124	−0.0025	44.1695	$+1.0x + 1.93y + 0.38z = +0.0495$	−0.0125
	.137	− .0009	.1841	1.0 1.94 0.38 + .0641	+ .0018
	.171	− .0007	.2183	1.0 1.94 0.38 + .0983	+ .0360
	.103	− .0021	.1519	1.0 1.96 0.39 + .0319	− .0311
	.140	− .0019	.1901	1.0 1.96 0.40 + .0701	+ .0070
	.122	− .0028	.1732	1.0 1.95 0.42 + .0532	− .0097
	.117	− .0009	.1701	1.0 1.95 0.42 + .0501	− .0128
	.150	− .0009	.2031	1.0 1.95 0.42 + .0831	+ .0202

Assumed Mean Difference: 44.1200

		R			R	R	
Normals:	$+31.00x + 3.57y - 3.51z = +0.0344$		*Solution:*	$x = -0.0016$	±0.0019	Wt.	28.06
	$+3.57 + 110.83 + 0.40 = +3.4867$			$y = +0.0315$	±0.0010		110.79
	$-3.51 + 0.40 + 4.40 = +0.0513$			$z = +0.0075$	±0.0051		3.99

$[nn] = 0.11659$ $[vv] = 0.00657$ Prob. Error 1 Eq. = ±0″.131

$\pi = +0''.400 \pm 0''.012$

My two results for this star then are:—

C. Series I:	$\pi = +0''.385$	$\pm 0''.013$	Wt. 119.2	Prob. Error 1 Obs.	$\pm 0''.143$	32 Obs.
C. " II:	$\pi = +0.400$	±0.012	110.8		±0.131	31

which combined in the adopted manner give:—

Method α: $\pi = +0''.392 \pm 0''.010$
" β: $\pi = +0.392$ ±0.009
" γ: $\pi = +0.393$ ±0.009

whence the adopted final value:—

Lalande 21185: $\pi = +0''.392 \pm 0''.009$

§ 13. Groombridge 34. Chase.

This star has the very considerable proper motion of 2″.86 per year. During the years 1863–1866 Auwers made a series of chronographic measures upon it with the equatorial of the Gotha Observatory, from which he derived for the parallax $\pi = +0''.29 \pm 0''.025$. Flint in 1895 by the transit method found $\pi = +0''.31 \pm 0''.034$. And Russell in 1907 by the photographic method got the value $\pi = +0''.250 \pm 0''.012$.

Although there is no great disparity between these results, all deduced by different methods, it was thought desirable to add also a heliometer determination, and so I have carried through the following two series.

Groombridge 34	B. D. +43°, 44	Mag. 8.1	R. A. 0h 10.1m	Decl. +43° 12′	Pos. Angle.
a	+43°, 10	8.8	0 2.5	43 17	273°.9
b	+43°, 80	8.5	0 18.3	43 22	83°.5

	Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	June 8	20 24	2	50.5	406.0338 *	415.5942 *	+0.125	−0.127	821.626
	11	20 2	2	45	405.9988 *	.5982 *	.123	.126	.594
	27	19 40	3	57.5	406.0248 *	.5842 *	.113	.116	.606
	July 3	20 10	2	55	.0098 *	.5452 *	.109	.112	.552
	4	19 39	2–3	59.5	.0248 *	.5792 *	.109	.111	.602
	5	20 17	2–3	61	.0098 *	.5552 *	.108	.110	.563
1907	Dec. 6	3 20	3	28	406.062	415.493	+0.016	−0.016	821.555
	8	3 25	1–2	36.5	.058	.488	.015	.015	.546
	8	4 46	2–3	35	.053	.508	.015	.015	.561
	12	3 4	2	23.5	.054	.500	.012	.012	.554
	19	3 12	1–2	23.5	.065	.481	.008	.008	.546
	19	4 26	2–3	22.5	.050	.490	.008	.008	.540
	21	3 41	2	26	.050	.468	.007	.007	.518
	24	3 35	3–4	31	.066	.504	.005	.005	.570
	25	4 21	3–4	37.5	.078	.491	.004	.004	.569
	26	3 27	2	31	.078	.490	.004	.004	.568
	27	3 27	3	37.5	.075	.496	.003	.003	.571
	31	4 2	3	31	.063	.474	.000	.000	.537
1908	June 2	19 37	1–2	56.5	406.208	415.346	−0.092	+0.094	821.556
	4	20 9	2–3	59	.207	.337	.094	.096	.546
	6	19 22	2	50.5	.221	.337	.095	.097	.560
	7	19 22	2	56.5	.227	.316	.096	.098	.545
	9	19 32	2–3	62	.223	.342	.097	.099	.567
	10	19 22	1–2	62	.244	.362	.097	.099	.608
						Assumed Annual Proper Motion and Mean Sum:	+0.220	−0.225	821.560

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	9.5604	−0.0008	9.3076	$+1.0x - 1.78y - 0.57z =$	−0.0524	−0.0212
	.5994	− .0004	.3500	1.0 1.80 0.56	− .0100	+ .0219
	.5594	− .0006	.3298	1.0 1.85 0.51	− .0302	+ .0039
	.5354	+ .0001	.3145	1.0 1.83 0.50	− .0455	− .0117
	.5544	− .0005	.3339	1.0 1.83 0.49	− .0261	+ .0079
	.5454	− .0001	.3273	1.0 1.83 0.49	− .0327	+ .0013
C.	9.431	+0.0001	9.3991	$+1.0x + 1.71y - 0.07z =$	+0.0391	−0.0114
	.430	+ .0002	.4002	1.0 1.72 0.07	+ .0402	− .0105
	.455	− .0000	.4250	1.0 1.72 0.07	+ .0650	+ .0143
	.446	+ .0001	.4221	1.0 1.76 0.05	+ .0621	+ .0107
	.416	+ .0002	.4002	1.0 1.79 0.04	+ .0402	− .0117
	.440	+ .0002	.4242	1.0 1.79 0.04	+ .0642	+ .0123
	.418	+ .0005	.4045	1.0 1.79 0.03	+ .0445	− .0072
	.438	− .0001	.4279	1.0 1.80 0.02	+ .0679	+ .0160
	.413	− .0001	.4049	1.0 1.80 0.02	+ .0449	− .0070
	.412	− .0001	.4039	1.0 1.80 0.02	+ .0439	− .0080
	.421	− .0001	.4149	1.0 1.79 0.01	+ .0549	+ .0035
	.411	+ .0003	.4113	1.0 1.78 0.00	+ .0513	+ .0003
C.	9.138	+0.0000	9.3240	$+1.0x - 1.73y + 0.42z =$	−0.0360	+0.0119
	.130	+ .0002	.3202	1.0 1.75 0.43	− .0398	+ .0088
	.116	.0000	.3080	1.0 1.76 0.43	− .0520	− .0031
	.089	+ .0002	.2832	1.0 1.77 0.44	− .0768	− .0275
	.119	− .0001	.3149	1.0 1.79 0.44	− .0451	+ .0047
	.118	− .0005	.3135	1.0 1.79 0.44	− .0465	+ .0033
	Assumed Mean Difference:		9.3600			

Groom. 34 — *continued.*

Normals:	+24.00 x	− 0.26 y	−0.97 z	= +0.1257 R	*Solution:*	x = +0.0047 R	±0.0017 R	Wt. 23.66
	− 0.26	+76.19	+0.29	= +1.9764		y = +0.0260	±0.0009	76.16
	− 0.97	+ 0.29	+2.78	= −0.0476		z = −0.0182	±0.0051	2.74

$[nn]$ = 0.05640 $[vv]$ = 0.00344 Prob. Error 1 Eq. = ±0.″108

π = +0.″329 ±0.″012

Groombridge 34	B. D. +43°, 44	Mag. 8.1	R. A. 0h 10.1m	Decl. +43° 12′	Pos. Angle.
c	+43°, 18	8.0	0 4.7	43 1	259°.3
d	+43°, 72	6.5	0 16.4	43 28	77°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 June 11	19 22	2	45	296.9216 *	319.8838 *	+0.126	−0.126	616.805
27	20 24	3	58	.9466 *	.9158 *	.116	.116	.862
July 3	19 33	2	55.5	.9346 *	.8698 *	.112	.112	.804
3	20 44	2	54.5	.9186 *	.8628 *	.112	.112	.781
4	20 12	2–3	59	.9406 *	.8918 *	.112	.111	.833
5	19 42	2–3	61.5	.9176 *	.8778 *	.111	.110	.796
1907 Dec. 6	4 0	3	27.5	296.984	319.809	+0.016	−0.016	616.793
6	4 33	3	27	.984	.824	.016	.016	.808
8	4 7	3–4	35.5	.997	.832	.015	.015	.829
2	3 42	2	23.5	.978	.804	.012	.012	.782
12	4 21	2	22.5	.998	.813	.012	.012	.811
19	3 50	1–2	23	.998	.815	.008	.008	.813
21	3 3	2	26.5	.979	.797	.007	.007	.776
25	3 41	3–4	38	.997	.821	.004	.004	.818
26	4 5	2	30	.997	.820	.004	.004	.817
26	4 39	2–3	29.5	.999	.813	.004	.004	.812
27	4 2	3	37	297.015	.808	.003	.003	.823
31	3 22	3	31	296.996	.798	.000	.000	.794
1908 June 2	20 13	1–2	56	297.153	319.679	−0.095	+0.094	616.831
4	19 26	2–3	59.5	.136	.659	.096	.096	.795
6	20 6	2	49.5	.146	.657	.097	.097	.803
7	20 3	2	56	.150	.664	.099	.098	.813
9	20 8	2–3	61.5	.138	.668	.099	.099	.806
10	20 4	1–2	59.5	.144	.660	.100	.099	.803
Assumed Annual Proper Motion and Mean Sum:						+0.226	−0.225	616.810

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	22.9622	+0.0002	22.7104	+1.0 x	−1.83 y	−0.56 z	= −0.0496	−0.0163
	.9692	− .0019	.7353	1.0	1.93	0.51	− .0247	+ .0116
	.9352	+ .0002	.7114	1.0	1.94	0.50	− .0486	− .0120
	.9442	+ .0011	.7213	1.0	1.94	0.50	− .0387	− .0021
	.9512	− .0009	.7273	1.0	1.94	0.49	− .0327	+ .0040
	.9602	+ .0005	.7397	1.0	1.94	0.49	− .0203	+ .0164
C.	22.825	+0.0006	22.7936	+1.0 x	+1.70 y	−0.07 z	= +0.0336	−0.0069
	.840	+ .0001	.8081	1.0	1.70	0.07	+ .0481	+ .0076
	.835	− .0007	.8043	1.0	1.72	0.07	+ .0443	+ .0034

Groom. 34 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	22.826	+0.0010	22.8030	+1.0 x	+1.79 y	−0.05 z	= +0.0430	+0.0008
	.815	− .0000	.7910	1.0	1.79	0.05	+ .0310	− .0112
	.817	− .0001	.8009	1.0	1.85	0.04	+ .0409	− .0026
	.818	+ .0013	.8053	1.0	1.86	0.03	+ .0453	+ .0017
	.824	− .0003	.8157	1.0	1.88	0.02	+ .0557	+ .0117
	.823	− .0003	.8147	1.0	1.88	0.02	+ .0547	+ .0107
	.814	− .0001	.8059	1.0	1.88	0.02	+ .0459	+ .0019
	.793	− .0005	.7865	1.0	1.88	0.01	+ .0265	− .0173
	.802	+ .0006	.8026	1.0	1.89	0.00	+ .0426	− .0013
C.	22.526	−0.0008	22.7142	+1.0 x	−1.71 y	+0.42 z	= −0.0458	−0.0026
	.523	+ .0006	.7156	1.0	1.75	0.43	− .0444	− .0002
	.511	+ .0003	.7053	1.0	1.77	0.43	− .0547	− .0100
	.514	− .0001	.7109	1.0	1.79	0.44	− .0491	− .0039
	.530	+ .0001	.7281	1.0	1.81	0.44	− .0319	+ .0138
	.516	+ .0003	.7153	1.0	1.82	0.44	− .0447	+ .0012

Assumed Mean Difference: 22.7600

Normals:			R	*Solution:*	R	R	
+24.00 x	− 0.37 y	−0.91 z	= +0.0264	x =	+0.0010	±0.0014	Wt. 23.69
− 0.37	+80.66	+0.41	= +1.8214	y =	+0.0227	±0.0007	80.59
− 0.91	+ 0.41	+2.70	= −0.0262	z =	−0.0128	±0.0040	2.67

$[nn] = 0.04356$ $[vv] = 0.00195$ Prob. Error 1 Eq. = ±0.″083

$\pi = +0.''288$ $\pm 0.''009$

The two results here found, agreeing so well with each other and so well with the values found by other observers, seem to leave very little uncertainty as to the true value of the parallax of this star.

These two results are: —

C.	Series I:	$\pi = +0.''329$	$\pm 0.''012$	Wt. 76.2	Prob. Error 1 Obs. $\pm 0.''108$	24 Obs.
C.	" II:	$\pi = +0.288$	± 0.009	80.6	± 0.083	24

Combining them in the manner heretofore described I have: —

Method α: $\pi = +0.''308$ $\pm 0.''010$
" β: $\pi = +0.307$ ± 0.008
" γ: $\pi = +0.303$ ± 0.007

whose mean is taken as my adopted and final value: —

Groombridge 34: $\pi = +0.''306$ $\pm 0.''008$

§ 14. Second Magnitude Stars. Chase and Smith.

These stars comprise the remaining six northern stars brighter than magnitude 2.5, for which there had been no previous adequate determinations of parallax. A sufficient number of observations was planned and secured to bring the effect of casual errors down to quite a low figure. Since they were taken up, Dr. Peter has published a determination for ζ Ursae Majoris.

It should be further remarked that four of the six stars are doubles. For γ Andromedae naturally the larger star was observed. The distance of the fainter component is about 10″ and its position angle 66°, the line connecting the two making angles of only 2°, 8° and 14° respectively with the average direction of the comparison stars of the three series. This and the practical obliteration of the fainter component by use of the screens made the observations of this star comparatively easy. For α Geminorum also, the brighter component of the double was measured; the position angle of the companion, distant about 6″ was 224°, differing 45° and 8° from the average direction of the two comparison star pairs. For γ Leonis the point midway between the two components, separated about 4″ in position angle 116°, had to be observed; the average directions of the comparison star lines are both nearly that of the double, being 102° and 107°. The brighter component of ζ Ursae Majoris was taken, the distance and position angle of the smaller star being 14″ and 150°, the one pair of comparison stars differing about 80° and the other single comparison star about 48° in direction from the line of the double. While these double stars, because of their bright components, may have presented peculiar observational difficulties in some cases, yet with the consistent use of the reversing prism eyepiece, it seems hard to believe that any large systematic error should remain in the results.

The data are given on the following pages: —

γ_1 Andromedae	B. D. +41°, 395	Mag. 2.0	R. A. 1^h 55.0^m	Decl. +41° 38′	Pos. Angle.
a	+41°, 374	7.0	1 47.8	41 11	251°.8
b	+42°, 456	7.2	2 0.7	42 10	63°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	July	12	21	31	3–4	61	406.916 *	334.874 *	+0.000	+0.000	741.790
		13	22	6	2–3	60.5	.928 *	.863 *	.000	.000	.791
		20	21	8	3–4	64.5	.939 *	.888 *	.000	.000	.827
		26	20	59	3	60.5	.967 *	.893 *	.000	.000	.860
		27	21	53	3	63	.951 *	.993 *	.000	.000	.854
		31	22	23	2	65	.935 *	.885 *	.000	.000	.820
1908	Jan.	30	5	22	2	2.0	406.886	334.845	−0.000	−0.000	741.731
		31	5	59	3–4	10.5	.938	.862	.000	.000	.800
	Feb.	3	6	37	3	19.5	.921	.863	.000	.000	.784
		4	5	45	3–4	1	.906	.837	.000	.000	.743
		6	6	39	3	27	.937	.869	.000	.000	.806
		7	5	44	3	12.5	.915	.871	.000	.000	.786
		9	6	26	3–4	8.5	.918	.847	.000	.000	.765
		11	6	52	2	33	.930	.891	.000	.000	.821
		20	6	49	3–4	21	900	.853	.000	.000	.753
1908	July	5	21	16	2	73.5	406.951	334.875	−0.000	−0.000	741.826
		6	22	9	3–4	74.5	.936	.881	.000	.000	.817
		8	21	50	2	57	.943	.888	.000	.000	.831
		10	22	33	2	57	.940	.866	.000	.000	.806
							Assumed Annual Proper Motion and Mean Sum:		+0.000	+0.000	741.800

γ_1 Andromedae — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	72.042	+0.001	72.043	+1.0 x	+1.88 y	−0.47 z =	−0.017	−0.010
	.065	+ .001	.066	1.0	1.89	0.47	+ .006	+ .013
	.051	− .003	.048	1.0	1.97	0.45	− .012	− .005
	.074	− .006	.068	1.0	1.99	0.44	+ .008	+ .015
	.048	− .005	.043	1.0	2.00	0.43	− .017	− .010
	.050	− .002	.048	1.0	2.01	0.42	− .012	− .005
C.	72.041	+0.007	72.048	+1.0 x	−1.96 y	+0.08 z =	−0.012	−0.011
	.076	+ .000	.076	1.0	1.96	0.08	+ .016	+ .017
	.058	+ .002	.060	1.0	1.95	0.09	+ .000	+ .001
	.069	+ .006	.075	1.0	1.95	0.09	+ .015	+ .016
	.068	− .001	.067	1.0	1.95	0.10	+ .007	+ .008
	.044	+ .001	.045	1.0	1.95	0.10	− .015	− .014
	.071	+ .003	.074	1.0	1.94	0.11	+ .014	+ .015
	.039	− .002	.037	1.0	1.93	0.11	− .023	− .022
	.047	+ .005	.052	1.0	1.85	0.14	− .008	− .008
C.	72.076	−0.003	72.073	+1.0 x	+1.76 y	+0.51 z =	+0.013	+0.011
	.055	− .002	.053	1.0	1.77	0.51	− .007	− .009
	.055	− .003	.052	1.0	1.81	0.51	− .008	− .010
	.074	− .001	.073	1.0	1.84	0.52	+ .013	+ .011

Assumed Mean Difference: 72.060

Normals:				R	*Solution:*	R	R	
+19.00 x	+ 1.48 y	+0.27 z	=	−0.039	x =	−0.0022	±0.0021	Wt. 18.92
+ 1.48	+69.66	−3.31	=	−0.055	y =	−0.0003	±0.0011	64.79
+ 0.27	− 3.31	+2.33	=	+0.023	z =	+0.0097	±0.0061	2.17

$[nn]$ = 0.00310 $[vv]$ = 0.00276 Prob. Error 1 Eq. = ±″0.114

π = −″0.004 ±″0.014

γ_1 Andromedae	B. D. +41°, 395	Mag. 2.0	R. A. 1^h 55.0^m	Decl. +41° 38′	Pos. Angle.
c	+41°, 377	8.0	1 48.5	41 4	245°.1
d	+42°, 451	8.0	1 59.8	42 21	51°.5

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	July 12	22	17	3–4	60.5	386.426 *	319.826 *	+0.000	+0.000	706.252
	13	21	25	2–3	60.5	.426 *	.881 *	.000	.000	.307
	20	21	49	3–4	64	.456 *	.859 *	.000	.000	.315
	26	21	37	3	60.5	.458 *	.847 *	.000	.000	.305
	27	21	22	3	63	.441 *	.852 *	.000	.000	.293
	30	21	33	2–3	65	.470 *	.862 *	.000	.000	.332
1908	Jan. 30	6	10	2	1	386.390	319.827	−0.000	−0.000	706.217
	31	5	20	3–4	11	.411	.824	.000	.000	.235
	Feb. 3	5	56	3	19.5	.412	.826	.000	.000	.238
	4	6	27	3–4	0.5	.410	.853	.000	.000	.263
	6	6	3	3	27.5	.428	.821	.000	.000	.249
	7	6	29	3	12.5	.433	.845	.000	.000	.278
	9	5	47	3–4	8.5	.430	.836	.000	.000	.266
	11	5	35	2	33.5	.415	.861	.000	.000	.276
	17	6	13	3	23	.404	.843	.000	.000	.247
1908	July 5	21	54	2	73.5	386.443	319.876	−0.000	−0.001	706.318
	8	22	4	2	58.5	.435	.830	.000	.001	.264
	10	21	12	2	57	.410	.847	.000	.001	.256
	10	21	52	2	57	.398	.832	.000	.001	.229

Assumed Annual Proper Motion and Mean Sum: +0.000 +0.001 706.270

γ_1 **Andromedae** — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	66.600	+0.002	66.602	+1.0 x	+1.80 y	−0.47 z	= +0.022	+0.013
	.545	− .003	.542	1.0	1.82	0.47	− .038	− .046
	.597	− .004	.593	1.0	1.90	0.45	+ .013	+ .005
	.611	− .003	.608	1.0	1.94	0.44	+ .028	+ .020
	.589	− .002	.587	1.0	1.95	0.43	+ .007	− .001
	.608	− .006	.602	1.0	1.96	0.43	+ .022	+ .014
C.	66.563	+0.005	66.568	+1.0 x	−1.92 y	+0.08 z	= −0.012	−0.011
	.587	+ .003	.590	1.0	1.92	0.08	+ .010	+ .011
	.586	+ .003	.589	1.0	1.93	0.09	+ .009	+ .010
	.557	+ .001	.558	1.0	1.93	0.09	− .022	− .021
	.607	+ .002	.609	1.0	1.93	0.10	+ .029	+ .030
	.588	− .001	.587	1.0	1.94	0.10	+ .007	+ .008
	.594	+ .000	.594	1.0	1.94	0.11	+ .014	+ .015
	.554	− .001	.553	1.0	1.93	0.11	− .027	− .026
	.561	+ .002	.563	1.0	1.89	0.13	− .017	− .016
C.	66.567	−0.004	66.564	+1.0 x	+1.67 y	+0.51 z	= −0.016	−0.014
	.605	+ .001	.607	1.0	1.73	0.51	+ .027	+ .030
	.563	+ .000	.564	1.0	1.76	0.52	− .016	− .013
	.566	+ .004	.571	1.0	1.76	0.52	− .009	− .006

Assumed Mean Difference: 66.580

Normals:				R	*Solution:*	R	R	
+19.00 x	+ 0.96 y	+0.26 z	=	+0.031	x =	+0.0017	±0.0032	Wt. 18.94
+ 0.96	+66.89	−3.22	=	+0.099	y =	+0.0009	±0.0018	62.38
+ 0.26	− 3.22	+2.34	=	−0.029	z =	−0.0110	±0.0096	2.18

$[nn]$ = 0.00765 $[vv]$ = 0.00719 Prob. Error 1 Eq. = ±0″.180

π = +0″.012 ±0″.023

γ_1 Andromedae		B. D. +41°, 395	Mag. 2.0	R. A. 1h 55.0m	Decl. +41° 38′	Pos. Angle.
e		+40°, 407	6.9	1 49.2	40 59	239°.8
f		+42°, 449	7.5	1 59.5	42 31	43°.7

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *e*. R	Distance *f*. R	P. M. Corrections. R	R	Corrected Sum R
1907	July	26	22	16	3	60	362.327 *	339.930 *	−0.000	+0.001	702.258
		27	22	28	3	62.5	.308 *	.926 *	.000	.001	.235
		30	22	12	2–3	64	.287 *	.919 *	.000	.001	.207
		31	22	53	2	64	.295 *	.903 *	.000	.001	.199
	Aug.	1	22	24	3	63.5	.281 *	.924 *	.000	.001	.206
		1	22	57	3	63	.296 *	.906 *	.000	.001	.203
1908	Jan.	30	7	0	2	0.5	362.277	339.875	+0.000	−0.000	702.152
		31	6	43	3–4	10.5	.298	.925	.000	.000	.223
	Feb.	7	7	16	3	12.5	.274	.905	.000	.000	.179
		11	6	15	2	33	.300	.920	000	.000	.220
		17	6	14	3	23	.269	.905	.000	.000	.174
		17	7	7	3	22	.300	.890	.000	.000	.190
		18	6	6	3–4	20	.296	.920	.000	.000	.216
		20	6	8	3–4	21.5	.280	.894	.000	.000	.174
1908	July	5	22	32	3–4	72	362.307	339.926	+0.000	−0.001	702.232
		7	21	3	2–3	73.5	.304	.917	.000	.001	.220
		8	22	25	2	56	.287	.894	.000	.001	.180
		12	21	23	2	72.5	.288	.911	.000	.001	.198

Assumed Annual Proper Motion and Mean Sum: −0.000 +0.002 702.200

γ_1 **Andromedae** — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	22.397	−0.002	22.394	+1.0 x	+1.88 y	−0.44 z	= +0.014	+0.014
	.382	− .001	.380	1.0	1.89	0.43	+ .000	+ .001
	.368	− .000	.367	1.0	1.91	0.43	− .013	− .012
	.392	+ .000	.391	1.0	1.92	0.42	+ .011	+ .011
	.357	− .000	.356	1.0	1.92	0.42	− .024	− .023
	.390	− .000	.389	1.0	1.92	0.42	+ .009	+ .009
C.	22.402	+0.002	22.404	+1.0 x	−1.86 y	+0.08 z	= +0.024	+0.021
	.373	− .001	.372	1.0	1.87	0.08	− .008	− .011
	.369	+ .001	.370	1.0	1.89	0.10	− .010	− .013
	.380	− .001	.379	1.0	1.89	0.11	− .001	− .004
	.364	+ .001	.365	1.0	1.85	0.13	− .015	− .018
	.410	+ .000	.410	1.0	1.85	0.13	+ .030	+ .027
	.376	− .001	.375	1.0	1.85	0.13	− .005	− .008
	386	+ .001	.387	1.0	1.83	0.14	+ .007	+ .004
C.	22.381	−0.001	22.381	+1.0 x	+1.53 y	+0.51 z	= +0.001	−0.004
	.387	− .001	.387	1.0	1.59	0.51	+ .007	+ .002
	.393	+ .001	.395	1.0	1.62	0.51	+ .015	+ .010
	.377	+ .000	.378	1.0	1.70	0.53	− .002	− .007

Assumed Mean Difference: 22.380

				R		R	R	
Normals:	+18.00 x	+ 2.99 y	+0.40 z	= +0.040	*Solution:*	x = +0.0021	±0.0023	Wt. 17.70
	+ 2.99	+59.91	−3.25	= −0.014		y = +0.0000	±0.0013	54.55
	+ 0.40	− 3.25	+2.27	= +0.015		z = +0.0063	±0.0068	2.07

$[nn] = 0.00336$ $[vv] = 0.00318$ Prob. Error 1 Eq. = ±″0.124

π = +″0.000 ±″0.017

γ Orionis	B. D. +6°, 919	Mag. 2.0	R. A. $5^h\,17.4^m$	Decl. +6° 13′	Pos. Angle.
a	+6°, 904	9.0	5 13.4	6 4	261°.7
b	+6°, 938	8.4	5 21.9	6 43	66°.4

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	Mar. 30	8	35	2–3	50	285.402 *	347.909 *	0.000	0.000	633.311
	Apr. 2	8	14	2–3	33.5	.400 *	.899 *	.000	.000	.299
1907	Oct. 5	3	16	2–3	45.5	285.370 *	347.885 *	0.000	0.000	633.255
	9	2	26	2–3	39	.397 *	.863 *	.000	.000	.260
	10	3	10	3	43.5	.377 *	.900 *	.000	.000	.277
	12	2	32	3–4	41	.404 *	.899 *	.000	.000	.303
	13	2	56	2–3	41	.372 *	.846 *	.000	.000	.218
	13	3	33	3	40.5	.381 *	.860 *	.000	.000	.241
1908	Feb. 22	8	1	2	17.5	285.389	347.879	0.000	0.000	633.268
	24	7	36	2–3	17.5	.365	.875	.000	.000	.240
	28	7	29	3–4	20	.423	.889	.000	.000	.312
	29	7	44	2–3	20	.405	.880	.000	.000	.285
	Mar. 3	7	18	2	26.5	.390	.883	.000	.000	.273
	3	8	34	2	26	.412	.900	.000	.000	.312
	4	8	15	2–3	24	.381	.888	.000	.000	.269
	5	7	26	2–3	25.5	.417	.896	.000	.000	.313

γ Orionis — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Oct.	2	3 2	3	41.5	285.392	347.878	0.000	0.000	633.270
	5	2 46	2	42	.396	.892	.000	.000	.288
	9	3 24	2–3	50	.391	.892	.000	.000	.283
	12	3 29	2	34	.402	.879	.000	.000	.281
	12	3 59	1–2	32.5	.398	.886	.000	.000	.284
	14	2 27	3	46.5	.409	.887	.000	.000	.296
					Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	633.284

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	62.507	−0.003	62.504	+1.0 x	+1.76 y	−0.76 z	= +0.014	+0.006
	.499	− .001	.498	1.0	1.72	0.75	+ .008	+ .000
C.	62.515	+0.003	62.518	+1.0 x	−1.73 y	−0.24 z	= +0.028	+0.022
	.466	+ .002	.468	1.0	1.66	0.23	− .022	− .028
	.523	+ .001	.524	1.0	1.64	0.23	+ .034	+ .028
	.495	− .002	.493	1.0	1.59	0.22	+ .003	− .003
	.474	+ .007	.481	1.0	1.57	0.22	− .009	− .015
	.479	+ .004	.483	1.0	1.57	0.22	− .007	− .013
C.	62.490	+0.002	62.492	+1.0 x	+1.87 y	+0.14 z	= +0.002	+0.003
	.510	+ .004	.514	1.0	1.88	0.15	+ .024	+ .025
	.466	− .003	.463	1.0	1.91	0.16	− .027	− .026
	.475	− .000	.475	1.0	1.91	0 16	− .015	− .014
	.493	+ .001	.494	1.0	1.92	0.17	+ .004	+ .005
	.488	− .003	.485	1.0	1 92	0.17	− .005	− .004
	.507	+ .001	.508	1.0	1 91	0.17	+ .018	+ .019
	.479	− .003	.476	1.0	1.91	0.17	− .014	− .013
C.	62.486	+0.001	62.487	+1.0 x	−1.77 y	+0.75 z	= −0.003	+0.000
	.496	− .000	.496	1.0	1.73	0.76	+ .006	+ .009
	.501	+ .000	.501	1.0	1.66	0.77	+ .011	+ .014
	.477	+ .000	.477	1.0	1.59	0.78	− .013	− .009
	.488	.000	.488	1.0	1.59	0.78	− .002	+ .002
	.478	− .002	.476	1.0	1.55	0.78	− .014	− .010
	Assumed Mean Difference: 62.490							

Normals:

			R
+22.00 x	− 0.94 y	+3.04 z	= +0.021
− 0.94	+67.30	−5.55	= −0.012
+ 3.04	− 5.55	+5.22	= −0.037

Solution:

	R	R	
x =	+0.0022	±0.0025	Wt. 20.15
y =	−0.0009	±0.0014	61.13
z =	−0.0093	±0.0053	4.36

$[nn] = 0.00545$ $[vv] = 0.00503$ Prob. Error 1 Eq. = ±0.″139

$\pi = -0.''011 \pm 0.''018$

γ Orionis	B. D. +6°, 919	Mag. 2.0	R. A. 5h 17.4m	Decl. +6° 13′	Pos. Angle.
c	+5°, 891	8.5	5 12.8	5 31	238°.6
d	+6°, 941	8.4	5 22.3	6 50	63°.4

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Apr.	2	8 46	2–3	32.5	378.691 *	393.683 *	0.000	0.000	772.374
	11	8 43	2	39	.659 *	.681 *	.000	.000	.340
Oct.	5	3 59	2–3	45	378.631 *	393.667 *	0.000	0.000	772.298
	9	3 13	3	37.5	.636 *	.638 *	.000	.000	.274
	10	3 49	3	43.5	.614 *	.632 *	.000	.000	.246

γ Orionis — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1907 Oct.	12	3 17	3–4	41	378.662 *	393.660 *	0.000	0.000	772.322
	13	2 19	2–3	41	.630 *	.654 *	.000	.000	.284
	14	2 17	3	41.5	.625 *	.654 *	.000	.000	.279
1908 Feb.	22	8 44	2	17	378.624	393.651	0.000	0.000	772.275
	24	8 19	2–3	17	.630	.646	.000	.000	.276
	27	7 40	3	31.5	.626	.675	.000	.000	.301
	28	8 15	3–4	20	.649	.674	.000	.000	.323
	29	7 3	3–4	21	.633	.643	.000	.000	.276
Mar.	3	7 54	2	26	.661	.667	.000	.000	.328
	4	7 35	2–3	25	.641	.651	.000	.000	.292
	5	8 16	2–3	26	.644	.690	.000	.000	.334
1908 Oct.	2	3 45	3	41.5	378.624	393.671	0.000	0.000	772.295
	5	3 29	2	41	635	.668	.000	.000	.303
	9	2 44	2–3	51	.646	.688	.000	.000	.334
	12	2 56	2–3	34.5	.640	.673	.000	.000	.313
	14	3 3	3	45	.638	.667	.000	.000	.305
	14	3 38	3	44	.624	.657	.000	.000	.281
						Assumed Annual Proper Motion and Mean Sum:	0.000	0.000	772.300

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	14.992	−0.001	14.991	$+1.0x + 1.56y - 0.75z =$	−0.039	−0.016
	15.022	− .001	15.021	1.0 1.38 0.73	− .009	+ .014
C.	15.036	+0.000	15.036	$+1.0x - 1.54y - 0.24z =$	+0.006	+0.018
	.002	+ .001	.003	1.0 1.47 0.23	− .027	− .015
	.018	+ .001	.019	1.0 1.45 0.23	− .011	+ .002
	14.998	− .000	14.998	1.0 1.40 0.22	− .032	− .020
	15.024	+ .000	15.024	1.0 1.38 0.22	− .006	+ .006
	.029	+ .000	.029	1.0 1.36 0.22	− .001	+ .011
C.	15.027	+0.000	15.027	$+1.0x + 1.77y + 0.14z =$	−0.003	+0.004
	.016	+ .000	.016	1.0 1.78 0.15	− .014	− .007
	.049	− .000	.049	1.0 1.79 0.15	+ .019	+ .026
	.025	− .000	.025	1.0 1.80 0.16	− .005	+ .002
	.010	+ .000	.010	1.0 1.79 0.16	− .020	− .013
	.006	− .001	.005	1.0 1.79 0.17	− .025	− .018
	.010	+ .000	.010	1.0 1.78 0.17	− .020	− .013
	.046	− .001	.045	1.0 1.78 0.17	+ .015	+ .022
C.	15.047	+0.000	15.047	$+1.0x - 1.59y + 0.75z =$	+0.017	+0.011
	.033	− .000	.033	1.0 1.54 0.76	+ .003	− .003
	.042	− .001	.041	1.0 1.46 0.77	+ .011	+ .005
	.033	− .000	.033	1.0 1.40 0.78	+ .003	− .003
	.029	− .000	.029	1.0 1.36 0.78	− .001	− .007
	.033	+ .000	.033	1.0 1.36 0.78	+ .003	− .003
			Assumed Mean Difference:	15.030		

Normals:

			R
+22.00 *x*	− 0.09 *y*	+3.05 *z*	= −0.136
− 0.09	+54.81	−4.64	= −0.123
+ 3.05	− 4.64	+5.16	= +0.070

Solution:

	R	R	
x =	−0.0087	±0.0021	Wt. 20.05
y =	−0.0007	±0.0013	50.29
z =	+0.0180	±0.0044	4.35

$[nn] = 0.00623$ $[vv] = 0.00369$ Prob. Error 1 Eq. = ±0.″119

$\pi = -0.''009 \pm 0.''017$

a_2 Geminorum	B. D. +32°, 1581	Mag. 1.7	R. A. $7^h\ 25.3^m$	Decl. +32° 12′	Pos. Angle.
a	+32°, 1561	8.0	7 19.7	32 17	274°.1
b	+32°, 1599	7.0	7 30.6	32 20	83°.4

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1905 Oct. 16	3 26	2	49.5	339.266	319.805	−0.004	+0.002	659.069
23	3 48	3	39.5	.262	.786	.004	.002	.046
26	2 52	3	29.5	.252	.804	.004	.002	.054
28	3 48	2	38.5	.242	.790	.004	.002	.030
Nov. 4	3 17	3	38.5	.228	.787	.004	.002	.013
6	3 59	3	41.5	.237	.785	.003	.002	.021
1906 Mar. 20	12 1	2–3	24	339.240	319.797	+0.005	−0.002	659.040
22	11 26	3–4	19.5	.227	.790	.005	.002	.020
23	11 36	3	12.5	.201	.785	.005	.002	658.989
24	11 53	3	16	.226	.791	.005	.003	659.019
25	12 10	1–2	22	.229	.788	.005	.003	.019
Apr. 2	11 10	3	30.5	.191	.772	.006	.003	658.966
13	11 37	3	39.5	.226	.789	.007	.003	659.019
May 16	12 23	4	61.5	.258	.807	.008	.004	.069
1906 Oct. 11	3 32	3–4	34.5	339.236	319.804	+0.018	−0.009	659.049
12	3 52	3	33	.209	.789	.018	.009	.007
14	2 54	3–4	42.5	.229	812	.018	.009	.050
25	4 39	3–4	47	.218	.821	.019	.009	.049
26	3 24	2	46	.224	.803	.019	.009	.037
31	3 36	2	34.5	.237	.802	.019	.009	.049
Assumed Annual Proper Motion and Mean Sum:						−0.023	+0.011	659.031

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	19.461	−0.001	19.454	+1.0 *x*	+1.92 *y*	−0.21 *z*	= +0.008	+0.003
	.476	− .000	.470	1.0	1.90	0.19	+ .024	+ .019
	.448	− .001	.441	1.0	1.89	0.18	− .005	− .010
	.452	+ .000	.446	1.0	1.87	0.17	+ .000	− .005
	.441	+ .001	.436	1.0	1.78	0.16	− .010	− .015
	.452	+ .000	.447	1.0	1.76	0.15	+ .001	− .004
S.	19.443	−0.000	19.450	+1.0 *x*	−1.82 *y*	+0.22 *z*	= +0.004	+0.006
	.437	+ .000	.444	1.0	1.84	0.22	− .002	+ .000
	.416	+ .001	.424	1.0	1.84	0.22	− .022	− .020
	.435	+ .000	.443	1.0	1.85	0.23	− .003	+ .000
	.441	+ .000	.449	1.0	1.86	0.23	+ .003	+ .005
	.419	+ .002	.430	1.0	1.91	0.25	− .016	− .013
	.437	+ .000	.447	1.0	1.94	0.29	+ .001	+ .004
	.451	− .001	.462	1.0	1.60	0.37	+ .016	+ .019
S.	19.432	−0.001	19.458	+1.0 *x*	+1.92 *y*	+0.78 *z*	= +0.012	+0.012
	.420	+ .001	.448	1.0	1.92	0.78	+ .002	+ .002
	.417	− .001	.443	1.0	1.92	0.79	− .003	− .003
	.397	− .001	.424	1.0	1.89	0.82	− .022	− .022
	.421	− .000	.449	1.0	1.89	0.82	+ .003	+ .003
	.435	− .001	.462	1.0	1.83	0.83	+ .016	+ .017
Assumed Mean Difference:			19.446					

Normals: R

+20.00 *x* + 7.83 *y* +5.79 *z* = +0.007
+ 7.83 +69.12 +3.47 = +0.090
+ 5.79 + 3.47 +4.59 = −0.012

Solution:

	R	R	
x =	+0.0014	±0.0022	Wt. 12.5
y =	+0.0014	±0.0010	65.6
z =	−0.0055	±0.0046	2.9

[*nn*] = 0.00270 [*vv*] = 0.00254 Prob. Error 1 Eq. = ±″0.099

π = +″0.018 ±″0.012

α_2 Geminorum	B. D. +32°, 1581	Mag. 1.7	R. A. $7^h\ 25.3^m$	Decl. +32° 12′	Pos. Angle.
c	+31°, 1598	8.0	7 21.2	31 26	229°.8
d	+32°, 1592	7.5	7 28.9	32 45	53°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *δ*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum R
1905	Oct. 16	4 24	2	49	331.037	264.497	−0.003	+0.005	595.536
	21	3 1	3–4	36.5	.059	.493	.002	.005	.555
	23	4 14	3	38	.045	.486	.002	.005	.534
	26	3 24	3	29.5	.034	.487	.002	.005	.524
	28	3 18	2	38.5	036	.488	.002	.004	.526
	Nov. 4	3 44	3	36.5	.011	.475	.002	.004	.488
1906	Mar. 21	12 2	3	30.5	331.024	264.500	+0.003	−0.006	595.521
	22	11 48	3–4	18	.007	.499	.003	.006	.503
	23	12 3	3	12.5	330.997	.467	.003	.006	.461
	24	11 29	3	18.5	331.002	.481	.003	.006	.480
	25	11 45	1–2	23	.005	.483	.003	.006	.485
	26	12 21	3	15.5	.015	.488	.003	.006	.500
	Apr. 2	11 37	3	30.5	.011	.490	.003	.006	.498
	May 10	11 39	4	41.5	.001	.505	.004	.009	.501
1906	Oct. 12	3 26	3	34	331.028	264.520	+0.009	−0.020	595.537
	25	4 14	3	47	.002	.528	.010	.021	.519
	26	3 1	2	46.5	.003	.508	.010	.021	.500
	31	3 11	2	35	.017	.523	.010	.022	.528
	Nov. 2	4 2	1–2	39.5	.027	.498	.010	.022	.513
	6	2 49	2	38	330.994	.505	.010	.022	.487
	Assumed Annual Proper Motion and Mean Sum:						−0.012	+0.026	595.510

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	66.540	−0.003	66.529	+1.0 *x*	+1.34 *y*	−0.21 *z*	= −0.001	−0.012
	.566	− .005	.554	1.0	1.34	0.19	+ .024	+ .013
	.559	− .003	.549	1.0	1.34	0.19	+ .019	+ .008
	.547	− .002	.538	1.0	1.34	0.18	+ .008	− .003
	.548	− .002	.540	1.0	1.33	0.17	+ .010	− .001
	.536	+ .002	.532	1.0	1.29	0.16	+ .002	− .008
S.	67.524	−0.001	66.532	+1.0 *x*	−1.22 *y*	+0.22 *z*	= +0.002	+0.002
	.508	+ .001	.518	1.0	1.23	0.22	− .012	− .012
	.530	+ .006	.545	1.0	1 23	0.22	+ .015	+ .015
	.521	+ .003	.533	1.0	1.24	0.23	+ .003	+ .003
	.522	+ .003	.534	1.0	1.25	0.23	+ .004	+ .004
	.527	+ .001	.537	1.0	1.26	0.23	+ .007	+ .007
	.521	+ .001	.531	1.0	1.31	0.25	+ .001	+ .001
	.496	+ .001	.510	1.0	1.27	0.36	− .020	− .018
S.	67.508	−0.003	66.534	+1.0 *x*	+1.32 *y*	+0.78 *z*	= +0.004	+0.005
	.474	− .001	.504	1.0	1.34	0.82	− .026	− .025
	.495	+ .001	.527	1.0	1.34	0.82	− .003	− .002
	.494	− .002	.524	1.0	1.32	0.83	− .006	− .005
	.529	− .000	.561	1.0	1.31	0.84	+ .031	+ .033
	.489	+ .003	.524	1.0	1.28	0.85	− .006	− .004

Assumed Mean Difference: 66.530

	R		R	R
Normals:	+20.00 *x*	+ 5.88 *y* + 5.80 *z*	= +0.056	*Solution:* x = +0.0056 ±0.0024 Wt. 12.7
	+ 5.88	+33.61 + 2.59	= +0.075	y = +0.0022 ±0.0015 31.6
	+ 5.80	+ 2.59 + 4.77	= −0.019	z = −0.0121 ±0.0048 3.1

$[nn] = 0.00369$ $[vv] = 0.00300$ Prob. Error 1 Eq. = ±″0.108

π = +″0.028 ±″0.019

γ Leonis	B. D. +20°, 2467	Mag. 2.0	R. A. $10^h 12.0^m$	Decl. +20° 35′	Pos. Angle.
a	+20°, 2447	7.7	10 4.0	20 49	278°.2
b	+20°, 2487	6.8	10 19.1	20 6	106°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1905 Nov. 14	6 24	3	19.5	532.256	492.371	+0.034	−0.034	1024.627
19	6 24	3	25	.244	.392	.034	.034	.636
1906 Jan. 7	6 29	3	25	.223	.373	.030	.030	.596
1906 June 4	14 18	3–4	62.5	532.242	492.374	+0.018	−0.018	1024.616
14	14 27	3–4	62.5	.263	.391	.016	.016	.654
20	14 37	2	62.5	.241	.368	.016	.016	.609
27	15 2	3–4	72.5	.285	.390	.015	.015	.675
July 1	15 7	2	66.5	.235	.386	.015	.015	.621
1906 Nov. 7	7 24	2–3	33	532.223	492.366	+0.004	−0.004	1024.589
Dec. 18	6 9	2	10	.264	.374	.001	001	.638
19	7 30	2	6	.251	.348	.001	.001	.599
1907 Jan. 4	6 19	3	30.5	.246	.344	−.000	+.000	.590
5	7 18	3	32	.239	.339	.000	.000	.578
6	7 20	3–4	38.5	.226	.316	.001	.001	.542
8	6 56	2	22.5	.234	.330	.001	.001	.564
9	6 36	2	17.5	.249	.326	.001	.001	.575
1907 May 29	13 4	2	53	532.211	492.303	−0.012	+0.012	1024.514
31	13 18	3–4	50	.234	.309	.012	.012	.543
June 9	14 7	3–4	57	.270	.316	.013	.013	.586
12	14 3	1–2	56	.261	.307	.013	.013	.568
16	14 16	1	70.5	.262	.301	.014	.014	.563
19	14 46	3–4	64.5	.287	.302	.014	.014	.589
1907 Dec. 6	6 20	2	26	532.314 *	492.306 *	−0.028	+0.028	1024.620
12	6 22	2–3	22	.282 *	.302 *	.029	.029	.584
31	6 27	2	30.5	.269 *	.276 *	.030	.030	.545
1908 Jan. 6	7 1	2	22.5	.273 *	.297 *	.031	.031	.570
Assumed Annual Proper Motion and Mean Sum:						+0.030	−0.030	1024.592

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	39.885	−0.001	39.952	$+1.0x + 1.91y - 1.13z =$	+0.039	+0.049
	.852	− .002	.918	1.0 1.93 1.12	+ .005	+ .015
	.850	− .000	.910	1.0 1.28 0.98	− .003	+ .006
S.	39.868	−0.001	39.903	$+1.0x - 1.91y - 0.58z =$	−0.010	−0.005
	.872	− .002	.902	1.0 1.81 0.55	− .011	− .006
	.873	− .001	.904	1.0 1.73 0.53	− .009	− .004
	.895	− .003	.922	1.0 1.61 0.51	+ .009	+ .014
	.849	− .001	.878	1.0 1.52 0.50	− .035	− .030
S.	39.857	+0.000	39.865	$+1.0x + 1.85y - 0.15z =$	−0.048	−0.047
	.890	− .002	.890	1.0 1.93 0.03	− .023	− .023
	.903	− .000	.905	1.0 1.93 0.03	− .008	− .008
	.902	+ .000	.902	1.0 1.35 +0.01	− .011	− .011
	.900	+ .001	.901	1.0 1.33 0.01	− .012	− .012
	.910	+ .002	.910	1.0 1.31 0.02	− .003	− .003
	.904	+ .001	.903	1.0 1.26 0.02	− .010	− .010
	.923	+ .001	.922	1.0 1.24 0.02	+ .009	+ .009
S.	39.908	+0.003	39.887	$+1.0x - 1.98y + 0.41z =$	−0.026	−0.029
	.925	+ .002	.903	1.0 1.96 0.41	− .010	− .013
	.954	+ .000	.928	1.0 1.86 0.44	+ .015	+ .011
	.954	+ .001	.929	1.0 1.83 0.45	+ .016	+ .012

γ Leonis — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	39.961	+0.001	39.934	+1.0 x	−1.79 y	+0.46 z =	+0.021	+0.017
	.985	+ .000	.957	1.0	1.75	0.47	+ .044	+ .040
S.	40.008	−0.001	39.951	+1.0 x	+1.85 y	+0.93 z =	+0.038	+0 030
	39.980	+ .000	.922	1.0	1.78	0.95	+ .009	− .000
	.993	+ .002	.935	1.0	1.43	1.00	+ .022	+ .013
	.976	+ .001	.915	1.0	1.31	1.02	+ .002	− .009

Assumed Mean Difference: 39.913

				R		R	R	
Normals:	+26.00 x	+ 3.94 y	+0.51 z =	+0.010	*Solution:*	x =	+0.0001 ±0.0030	Wt. 25.8
	+ 3.94	+74.31	+0.03 =	+0.008		y =	+0.0001 ±0.0017	73.7
	+ 0.51	+ 0.03	+9.91 =	+0.088		z =	+0.0089 ±0.0048	9.9

$[nn] = 0.01216$ $[vv] = 0.01141$ Prob. Error 1 Eq. = ±″0.191

π = +″0.001 ±″0.021

γ Leonis	B. D. +20°, 2467	Mag. 2.0	R. A. 10h 12.0m	Decl. +20° 35′	Pos. Angle.
c	+20°, 2460	8.2	10 9.8	20 43	286°.9

Date.	Sid. Time.	Def.	Temp.	Distance *c*.	P. M. Correction.	Corrected Sum. from γ Leonis *a* and *b*.
	h. m.		°	R	R	R
1905 Nov. 14	7 2	3	19.5	151.980	+0.034	1024.627
19	6 52	3	25.5	.970	.034	.636
1906 Jan. 7	6 55	3	25	.970	.029	.596
1906 June 4	14 42	3–4	62	152.005	+0.017	1024.616
14	14 49	3–4	62	.009	016	.654
20	14 56	2	62	151.987	016	.609
1906 Nov. 7	7 51	2–3	32	151.991	+0 004	1024.589
Dec. 18	6 32	2	10	.994	.001	.638
19	7 9	2	6	999	.001	.599
1907 Jan. 4	6 38	3	31.5	.983	−0.000	.590
5	6 55	3	34.5	.991	.000	.578
6	6 57	3–4	37.5	152 006	.001	.542
8	7 14	2	21	151.995	.001	.564
9	6 19	2	18	.997	.001	.575
1907 May 29	13 22	2	53	152 014	−0.012	1024.514
31	13 40	3–4	49	.020	.012	.543
June 9	14 28	3–4	56	.026	.013	.586
12	14 20	1–2	55	.003	.013	.568
16	14 32	1	69	.017	.014	.563
1907 Dec. 6	6 47	2	24.5	152.034 *	−0.028	1024.620
12	7 6	2–3	22	.027 *	.028	.584
31	6 58	2	30.5	.023 *	.030	.545
1908 Jan. 6	7 21	2	22	.023 *	.031	.570
Assumed Annual Proper Motion and Mean Sum:					+0.030	1024.592

γ Leonis — *continued.*

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.				Residuals. R
S.	−0.005	152.009	+1.0 x	+0.98 y	−1.13 z	= +0.007	+0.010
	− .007	151.997	1.0	0.98	1.12	− .005	− .002
	− .000	.999	1.0	0.64	0.98	− .003	− .002
S.	−0.004	152.018	+1.0 x	−0.97 y	−0.58 z	= +0.016	+0.007
	− .009	.016	1.0	0.91	0.55	+ .014	+ .005
	− .003	.000	1.0	0.87	0.53	− .002	− .010
S.	+0.000	151.995	+1.0 x	+0.96 y	−0.15 z	= −0.007	−0.002
	− .007	988	1.0	0.86	0.03	− .014	− .009
	− .001	999	1.0	0.85	0.03	− .003	+ .001
	+ .000	983	1.0	0.67	+0.01	− .019	− .016
	+ .002	.993	1.0	0.66	0.01	− .009	− .006
	+ .007	152.012	1.0	0.65	0.02	+ .010	+ .013
	+ .004	151.998	1.0	0.63	0.02	− .004	− .000
	+ .003	.999	1.0	0.62	0.02	− .003	− .000
S.	+0.012	152 014	+1.0 x	−1.00 y	+0.41 z	= +0.012	+0.004
	+ .007	.015	1.0	0.99	0.41	+ .013	+ .005
	+ .001	.014	1.0	0.94	0.44	+ .012	+ .005
	+ .004	151.994	1.0	0.93	0.45	− .008	− .015
	+ .004	152.007	1.0	0.90	0.46	+ .005	− .002
S.	−0.004	152.002	+1.0 x	+0.94 y	+0.93 z	= +0.000	+0.007
	+ .001	.000	1.0	0.91	0.95	− .002	+ .005
	+ .007	.000	1.0	0.71	1.00	− .002	+ .003
	+ .003	151.995	1.0	0.65	1.02	− .007	− .002

Assumed Mean Distance: 152.002

Normals:

			R
+23.00 x	+ 4.20 y	+1.05 z	= +0.001
+ 4.20	+16.53	−0.43	= −0.109
+ 1.05	− 0.43	+9.18	= −0.012

Solution:

	R	R	
x =	+0.0014	±0.0011	Wt. 21.8
y =	−0.0069	±0.0013	15.7
z =	−0.0018	±0.0017	9.1

$[nn] = 0.00196$ $[vv] = 0.00120$ Prob. Error 1 Eq. = ±0″.067

$\pi = -0''.088 \pm 0''.016$

ζ_1 Ursae Majoris — **B. D. +55°, 1598** — **Mag. 2.0** — **R. A. 13ʰ 18.1ᵐ** — **Decl. +55° 41′** — **Pos. Angle.**

a	+55°, 1587	7.7	13 9.7	55 10	246°.6
b	+56°, 1667	6.0	13 28.5	56 5	74°.3

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Feb. 6	7 31	3	4.5	368.998	431.661	+0.015	−0.011	800.663
8	8 54	2	14.5	.989	.640	.015	.011	.633
9	8 5	2	16	.994	.646	.015	.011	.644
10	8 43	2	30	.973	.630	.015	.011	.607
11	7 48	3–4	32.5	.983	.656	.015	.011	.643
13	7 36	2–3	23	.968	.622	.015	.011	.594

ζ_1 Ursae Majoris — *continued.*

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 July	3	18	7	2	59.5	368.994	431.629	+0.008	−0.006	800.625
	4	17	32	2–3	59	.992	.655	.008	.006	.649
	5	18	42	3–4	62.5	369.003	.632	.008	.006	.637
	6	17	36	3–4	60	.003	.640	.008	.006	.645
	7	18	20	3–4	72	368.977	.608	.008	.006	.587
	9	17	48	3	67.5	.985	.643	.008	.006	.630
	10	18	3	3	68	369.007	.641	.008	.006	.650
	12	18	3	3	64	.008	.648	.008	.006	.658
	13	19	13	3	64	.005	.647	.008	.006	.654
	19	17	50	3	74	368.995	.641	.008	.005	.639
	21	18	44	2–3	67.5	369.011	.647	.008	.005	.661
Aug.	26	19	11	3	61	.001	.640	.006	.004	.643
1908 Jan.	19	8	26	3–4	16	368.983 *	431.619 *	−0.001	+0.001	800.602
Feb.	6	7	33	3	25	369.037 *	.664 *	.002	.001	.700
	7	8	4	2–3	11.5	368.997 *	.632 *	.002	.001	.628
	8	7	57	3–4	0	369.010 *	.625 *	.002	.001	.634
	9	8	37	2	10.5	368.980 *	.620 *	.002	.001	.599
	10	8	25	2	18.5	369.002 *	.619 *	.002	.001	.620
Assumed Annual Proper Motion and Mean Sum:								+0.017	−0.012	800.635

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	62.663	−0.002	62.635	+1.0 x	−1.70 y	−0.90 z =	+0.005	+0.002
	.651	+ .000	.625	1.0	1.70	0.89	− .005	− .008
	.652	− .001	.625	1.0	1.70	0.89	− .005	− .008
	.657	+ .002	.633	1.0	1.69	0.89	+ .003	+ .000
	.673	− .001	.646	1.0	1.68	0.89	+ .016	+ .013
	.654	+ .003	.631	1.0	1.66	0.88	+ .001	− .002
S.	62.635	+0.001	62.622	+1.0 x	+1.50 y	−0.50 z =	−0.008	−0.005
	.663	− .001	.648	1.0	1.51	0.49	+ .018	+ .021
	.629	− .000	.615	1.0	1.53	0.49	− .015	− .012
	.637	− .001	.622	1.0	1.54	0.49	− .008	− .005
	.631	+ 004	.621	1.0	1.56	0.49	− .009	− .006
	.658	+ .000	.644	1.0	1.58	0.48	+ .014	+ .017
	.634	− .001	.619	1.0	1.60	0.48	− .011	− .008
	.640	− .002	.624	1.0	1.62	0.47	− .006	− .003
	.642	− .001	.627	1.0	1.64	0.47	− .003	− .000
	.646	− .000	.633	1.0	1.70	0.45	+ .003	+ .006
	.636	− .002	.621	1.0	1.71	0.45	− .009	− .006
	.639	− .001	.628	1.0	1.62	0.35	− .002	+ .001
S.	62.636	+0.003	62.641	+1.0 x	−1.64 y	+0.05 z =	+0.011	+0.009
	.627	− .005	.625	1.0	1.70	0.10	− .005	− .007
	.635	+ .001	.639	1.0	1.70	0.10	+ .009	+ .007
	.615	+ .000	.618	1.0	1.70	0.11	− .012	− .014
	.640	+ .003	.646	1.0	1.70	0.11	+ .016	+ .014
	.617	+ .001	.621	1.0	1.69	0.11	− .009	− .011
Assumed Mean Difference:			62.630					

Normals:

			R
+24.00 x	− 1.15 y	−10.37 z =	−0.011
− 1.15	+64.69	− 0.89 =	−0.101
−10.37	− 0.89	+ 7.42 =	+0.004

Solution:

	R	R	
x =	−0.0010	±0.0022	Wt. 9.4
y =	−0.0016	±0.0008	64.0
z =	−0.0010	±0.0039	2.9

$[nn] = 0.00226$ $[vv] = 0.00204$ Prob. Error 1 Eq. = ±0.″084

$\pi = -0.″020 \pm 0.″010$

ζ_1 Ursae Majoris	B. D. +55°, 1598	Mag. 2.0	R. A. $13^h\,18.1^m$	Decl. +55° 41′	Pos. Angle.
d	+55°, 1602	8.5	13 19.1	55 40	101°.8

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *d*. R	P. M. Correction. R	Corrected Sum from ζ_1 Urs. Maj. *a* and *b*. R
1907	Feb.	6	8	9	3	4	40.113	−0.007	800.663
		8	9	15	3	14.5	.121	.007	.633
		9	7	46	2	16.5	.117	.007	.644
		10	9	6	2	30	.118	.007	.607
		11	7	27	3–4	32.5	.126	.007	.643
		13	7	58	2–3	23	.117	.007	.594
1907	July	3	18	30	2	59	40.126	−0.004	800.625
		4	17	8	2–3	60	.119	.004	.649
		5	19	0	3–4	58.5	.133	.004	.637
		6	17	56	3–4	60	.122	.004	.645
		7	18	41	3–4	71	.131	.004	.587
		9	17	30	3	68.5	.143	.004	.630
		10	17	43	3	69	.111	.004	.650
		12	17	44	2–3	64.5	.112	.004	.658
		13	19	31	3	64	.117	.004	.654
		19	18	14	3	73	.113	.004	.639
		21	19	3	2–3	68	.117	.004	.661
	Aug.	26	19	29	3	60	.120	.003	.643
1908	Jan.	19	8	45	3–4	15	40.118 *	+0.000	800.602
	Feb.	6	7	59	3	24	.100 *	.001	.700
		7	8	27	2–3	11.5	.118 *	.001	.628
		8	9	25	3–4	−1.5	.109 *	.001	.634
		9	9	2	2	8	.114 *	.001	.599
		10	8	36	2	18	.105 *	.001	.620
							Assumed Annual Proper Motion and Mean Sum:	−0.008	800.635

Observer.	Scale Value Correction. R	Corrected Distance. R	Equations of Condition.				Residuals. R
S.	−0.001	40.105	+1.0 *x*	−0.74 *y*	−0.90 *z*	= −0.010	−0.008
	+ .000	.114	1.0	0.72	0.89	− .001	+ .001
	− .000	.110	1.0	0.71	0.89	− .005	− .003
	+ .001	.112	1.0	0.70	0.89	− .003	− .001
	− .000	.119	1.0	0.69	0.89	+ .004	+ .006
	+ .002	.112	1.0	0.67	0.88	− .003	− .001
S.	+0.000	40.122	+1.0 *x*	+0.96 *y*	−0.50 *z*	= +0.007	+0.004
	− .001	.114	1.0	0.96	0.49	− .001	− .004
	− .000	.129	1.0	0.96	0.49	+ .014	+ .011
	− .000	.118	1.0	0.96	0.49	+ .003	+ .000
	+ .002	.129	1.0	0.96	0.49	+ .014	+ .011
	+ .000	.139	1.0	0.96	0.48	+ .024	+ .021
	− .001	.106	1.0	0.96	0.48	− .009	− .012
	− .001	.107	1.0	0.95	0.47	− .008	− .011
	− .001	.112	1.0	0.95	0.47	− .003	− .006
	− .000	.109	1.0	0.93	0.45	− .006	− .009
	− .001	.112	1.0	0.92	0.45	− .003	− .006
	− .000	.117	1.0	0.58	0.35	+ .002	− .001
S.	+0.002	40.120	+1.0 *x*	−0.88 *y*	+0.05 *z*	= +0.005	+0.009
	− .003	.098	1.0	0.74	0.10	− .017	− .014
	+ .000	.119	1.0	0.73	0.10	+ .004	+ .007
	+ .000	.110	1.0	0.72	0.11	− .005	− .002
	+ .002	.117	1.0	0.71	0.11	+ .002	+ .005
	+ .001	.107	1.0	0.70	0.11	− .008	− .005
Assumed Mean Distance:		40.115					

ζ_1 **Ursae Majoris** — *continued.*

				R		R	R	
Normals:	$+24.00\,x$	$+2.34\,y$	$-10.37\,z$	$=-0.003$	*Solution:*	$x=-0.0007$	± 0.0019	Wt. 9.5
	$+2.34$	$+16.65$	-1.86	$=+0.056$		$y=+0.0037$	± 0.0015	16.2
	-10.37	-1.86	$+7.43$	$=-0.005$		$z=-0.0010$	± 0.0035	2.9

$[nn] = 0.00181$ $[vv] = 0.00162$ Prob. Error 1 Eq. $= \pm 0''.075$

$\pi = +0''.047$ $\pm 0''.019$

α Ophiuchi	B. D. $+12°$, 3252	Mag. 2.0	R. A. $17^h 28.2^m$	Decl. $+12° 40'$	Pos. Angle.
a	$+12°$, 3231	8.5	17 23.1	12 2	242°.5
b	$+13°$, 3423	7.5	17 33.0	13 23	58°.7

	Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	Mar. 20	14	7	∎	28	397.967	386.580	+0.017	+0.017	784.581
	Apr. 14	14	9	3–4	33	398.006	.628	.016	.016	.666
	19	14	9	3	32	397 947	.578	.015	.015	.555
	20	13	59	3	29	.983	.597	.015	.015	.610
	21	14	6	3	34.5	.988	.592	.015	.015	.610
	22	14	27	3	34.5	.967	.589	.015	.015	.586
1907	Sept. 13	20	19	2	66.5	397.982	386.606	+0.007	+0.007	784.602
	14	21	1	3	65.5	.975	.593	.007	.007	.582
	15	20	57	3	62	.996	.622	.006	.006	.630
	26	21	3	3–4	47	.978	.607	.006	.006	.597
	Oct. 1	20	34	3–4	49.5	.964	.601	.006	.006	.577
	2	20	58	3–4	49.5	.968	.604	.006	.006	.584
	8	20	43	3–4	46	976	.576	.005	.005	.562
	9	21	6	3	44	.959	.589	.005	.005	.558
	15	20	57	3	45	.968	.590	.005	.005	.568
	16	20	59	3	52	.970	.615	.005	.005	.595
	17	21	3	1–2	54	.969	.608	.004	.004	.585
	19	21	18	2–3	41.5	.980	.592	.004	.004	.580
1908	Apr. 21	14	13	3	36.5	397.986 *	386.598 *	−0.007	−0.007	784.570
	23	14	14	3	53	398.008 *	.620 *	.007	.007	.614
	26	14	43	2	56	397.988 *	.599 *	.007	.007	.573
	29	14	55	3–4	51	398.002 *	.629 *	.007	.007	.617
	May 10	14	11	3–4	41	398.016 *	.645 *	.008	.008	.645
	17	14	11	3	62	397.994 *	.604 *	.008	.008	.582
						Assumed Annual Proper Motion and Mean Sum:		+0.022	+0.022	784.593

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	11.387	+0.000	11.387	$+1.0\,x$	$+1.74\,y$	$-0.78\,z =$	+0.009	+0.004
	.378	− .001	.377	1.0	1.75	0.71	− .001	− .006
	.369	+ .001	.370	1.0	1.71	0.70	− .008	− .012
	.386	− .000	.386	1.0	1.70	0.70	+ .008	+ .004
	.396	− .000	.396	1.0	1.69	0.69	+ .018	+ .014
	.378	+ .000	.378	1.0	1.67	0.69	+ .000	− .004
S.	11.376	−0.000	11.376	$+1.0\,x$	$-1.67\,y$	$-0.30\,z =$	−0.002	+0.003
	.382	+ .000	.382	1.0	1.68	0.30	+ .004	+ .009
	.374	− .001	.373	1.0	1.69	0.29	− .005	− .000
	.371	− .000	.371	1.0	1.77	0.26	− .007	− .002
	.363	+ .000	.363	1.0	1.78	0.25	− .015	− .010
	.364	+ .000	.364	1.0	1.78	0.25	− .014	− .009

α Ophiuchi — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	11.400	+0.000	11.400	+1.0 x	−1.78 y	−0.23 z	= +0.022	+0.027
	.370	+ .000	.370	1.0	1.77	0.23	− .008	− .003
	.378	+ .000	.378	1.0	1.73	0.21	− .000	+ .005
	.355	− .000	.355	1.0	1.72	0.21	− .023	− .018
	.361	+ .000	.361	1 0	1.71	0.20	− .017	− .012
	.388	+ .000	.388	1.0	1.69	0.20	+ .010	+ .014
S.	11.388	+0.000	11.388	+1.0 x	+1.69 y	+0.31 z	= +0.010	+0.005
	.388	− .000	.388	1.0	1.66	0.31	+ .010	+ .005
	.389	+ .000	.389	1.0	1.63	0.32	+ .011	+ .006
	.373	− .000	.373	1.0	1.59	0.33	− .005	− .010
	.371	− .001	.370	1.0	1.41	0.36	− .008	− .013
	.390	+ .000	.390	1.0	1.33	0.38	+ .012	+ .007

Assumed Mean Difference: 11.378

Normals:				R	*Solution:*		R	R	
+24.00 x	− 1.20 y	−5.19 z	=	+0.002		x =	+0.0004	±0.0018	Wt. 17.9
− 1.20	+68.09	+0.83	=	+0.190		y =	+0.0028	±0.0009	67.9
− 5.19	+ 0.83	+4.44	=	+0.005		z =	+0.0010	±0.0041	3.3

$[nn]$ = 0.00296 $[vv]$ = 0.00250 Prob. Error 1 Eq. = ±0.″094

π = +0.″036 ±0.″011

α Ophiuchi **B. D. +12°, 3252** **Mag. 2.0** **R. A. 17h 28.2m** **Decl. +12° 40′** **Pos. Angle.**

c	+12°, 3234	6.5	17 23.6	12 3	240°.5
d	+13°, 3421	6.5	17 32.3	13 25	52°.8

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Mar. 15	14 22	3–4	33.5	364.196	353.668	+0.007	+0.007	717.878
16	13 48	3–4	31	.211	.665	.007	.007	.890
20	14 27	2	26.5	.185	.635	.007	.007	.834
Apr. 14	14 29	3–4	33.5	.187	.643	.006	.006	.842
19	14 33	3	32	.195	.636	.006	.006	.843
20	14 21	3	28	.184	.636	.006	.006	.832
1907 Sept. 13	20 36	2	66	364.177	353.659	+0.003	+0.003	717.842
14	21 19	3	65	.178	.687	.003	.003	.871
15	21 16	3	62	.207	.692	.003	.003	.905
25	21 12	3–4	51	.188	.690	.002	002	.882
26	21 20	3–4	46	.192	660	.002	.002	.856
Oct. 1	20 52	3–4	49.5	.158	.673	.002	.002	.835
2	21 19	3–4	49	.180	.662	.002	.002	.846
3	20 38	3	50.5	.156	.644	.002	.002	.804
9	20 47	3	44	.146	.644	.002	.002	.794
15	21 14	3	44	.166	.647	.002	002	.817
16	21 18	3	50	.160	.644	.002	002	.808
17	20 46	1–2	54	.170	.636	.002	.002	.810
1908 Apr. 21	14 39	3	36.5	364.198 *	353.657 *	−0.003	−0.003	717.849
23	14 38	3	52	.202 *	.658 *	.003	.003	.854
26	14 19	2	56	.185 *	.661 *	.003	.003	.840
29	14 32	3–4	51	.214 *	.693 *	.003	.003	.901
May 10	14 34	3–4	41	.195 *	.670 *	.003	.003	.859
17	14 33	3	61.5	.168 *	.647 *	.003	.003	.809
Assumed Annual Proper Motion and Mean Sum:						+0.009	+0.009	717.846

α Ophiuchi — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	10.528	−0.000	10.528	+1.0 x	+1.65 y	−0.80 z =	+0.004	−0.018
	.546	− .001	.545	1.0	1.65	0.79	+ .021	− .001
	.550	+ .000	.550	1.0	1.67	0.78	+ .026	+ .004
	.544	+ .000	.544	1.0	1.72	0.71	+ .020	− .001
	.559	+ .000	.559	1.0	1.69	0.70	+ .035	+ .014
	.548	+ .000	.548	1.0	1.68	0.70	+ .024	+ .003
S.	10.518	+0.000	10.518	+1.0 x	−1.59 y	−0.30 z =	−0.006	+0.005
	.491	− 000	.491	1.0	1.60	0.30	− .033	− .022
	.515	− .001	.514	1.0	1.62	0.29	− .010	+ .001
	.498	− .001	.497	1.0	1.71	0.27	− .027	− .015
	.532	− .000	.532	1.0	1.71	0.26	+ .008	+ .020
	.485	+ .000	.485	1.0	1.72	0.25	− .039	− .027
	.518	+ .000	.518	1.0	1.72	0.25	− .006	+ .006
	.512	+ .001	.513	1.0	1.72	0.24	− .011	+ .002
	.502	+ .001	.503	1.0	1.72	0.23	− .021	− .008
	.519	+ .000	.519	1.0	1.71	0.21	− .005	+ .008
	.516	+ .001	.517	1.0	1.70	0.21	− .007	+ .006
	.534	+ .001	.535	1.0	1.69	0.20	+ .011	+ .024
S.	10.541	−0.000	10.541	+1.0 x	+1.67 y	+0.31 z =	+0.017	+0.010
	.544	− .000	.544	1.0	1.65	0.31	+ .020	+ .014
	.524	+ .000	.524	1.0	1.61	0.32	+ .000	− .006
	.521	− .001	.520	1.0	1.58	0.33	− .004	− .010
	.525	− .000	.525	1.0	1.50	0.36	+ .001	− .004
	.521	+ .001	.522	1.0	1.38	0.38	− .002	− .005

Assumed Mean Difference: 10.524

Normals:			R	*Solution:*	R	R	
+24.00 x	− 0.76 y	−5.48 z	= +0.015	x =	−0.0023	±0.0021	Wt. 17.7
− 0.76	+65.68	+0.68	= +0.518	y =	+0.0079	±0.0011	65.6
− 5.48	+ 0.68	+4.78	= −0.048	z =	−0.0139	±0.0048	3.5

$[nn]$ = 0.00835 $[vv]$ = 0.00362 Prob. Error 1 Eq. = ±″0.113

π = +″0.101 ±″0.014

§ 15. Second Magnitude Stars — Final Values.

The results of the foregoing series are brought together and combined (v. pp. 215–16) as follows: —

γ_1 Andromedae.

Chase, Series I:	π = −″0.004	±″0.014	Wt. 64.8	Prob. Error 1 Obs.	±″0.114	19 Obs.
" " II:	π = +0.012	±0.023	62.4		±0.180	19
" " III:	π = +0 000	±0.017	54.5		±0.124	18

Method α: π = +″0.003 ±″0.008

" β: π = +0.003 ±0.010

" γ: π = +0.000 ±0.010

Adopted Value: π = +0.002 ±″0.009

γ Orionis.

CHASE, Series I:	$\pi = -0''.011$	$0''.018$	Wt. 61.1	Prob. Error 1 Obs.	$\pm 0''.139$	22 Obs.
" " II:	$\pi = -0.009$	± 0.017	50.3		± 0.119	22

Method α: $\pi = -0''.010$ $\pm 0''.010$
" β: $\pi = -0.010$ ± 0.012
" γ: $\pi = -0.010$ ± 0.012

Adopted Value: $\pi = -0''.010 \pm 0''.011$

α_2 Geminorum.

SMITH, Series I:	$\pi = +0''.018$	$\pm 0''.012$	Wt. 65.6	Prob. Error 1 Obs.	$\pm 0''.099$	20 Obs.
" " II:	$\pi = +0.028$	± 0.019	31.6		± 0.108	20

Method : $\pi = +0''.023$ $\pm 0''.015$
" β: $\pi = +0.021$ ± 0.010
" γ: $\pi = +0.021$ ± 0.010

Adopted Value: $\pi = +0''.022 \pm 0''.012$

γ Leonis.

SMITH, Series I:	$\pi = +0''.001$	$\pm 0''.021$	Wt. 73.7	Prob. Error 1 Obs.	$\pm 0''.191$	26 Obs.
" " II:	$\pi = -0.088$	± 0.016	15.7		± 0.067	23

Method α: $\pi = -0''.043$ $\pm 0''.015$
" β: $\pi = -0.040$ ± 0.011
" γ: $\pi = -0.055$ ± 0.013

Adopted Value: $\pi = -0''.046 \pm 0''.013$

ζ_1 Ursae Majoris.

SMITH, Series I:	$\pi = -0''.020$	$\pm 0''.010$	Wt. 64.0	Prob. Error 1 Obs.	$\pm 0''.084$	24 Obs.
" " II:	$\pi = +0.047$	± 0.019	16.2		± 0.075	24

Method α: $\pi = +0''.013$ $\pm 0''.015$
" β: $\pi = +0.014$ ± 0.009
" γ: $\pi = -0.006$ ± 0.009

Adopted Value: $\pi = +0''.007 \pm 0''.011$

α Ophiuchi.

SMITH, Series I:	$\pi = +0''.036$	$\pm 0''.011$	Wt. 67.9	Prob. Error 1 Obs.	$\pm 0''.094$	24 Obs.
" " II:	$\pi = +0.101$	± 0.014	65.6		± 0.113	24

Method α: $\pi = +0''.068$ $\pm 0''.015$
" β: $\pi = +0.068$ ± 0.009
" γ: $\pi = +0.061$ ± 0.009

Adopted Value: $\pi = +0''.066 \pm 0''.011$

§ 16. Seven Repeated Stars. Chase and Smith.

These series include four stars of the Yale survey, which showed negative results for the parallax of more than 0″.10, two which yielded the large positive value of + 0″.20 and a further series on Weisse 17^h, 322 with the pair of comparison stars which had given a wide range of values.

Three of these stars were under observation before Jan. 3, 1909, and after Jan. 17, 1909, and hence have been treated with two values of x. For 33 Virginis and Weisse 21^h, 97 the same comparison stars were taken as previously, and thus the proper motion correction could be determined with considerable accuracy. For Lalande 19896, in order not to delay the publication unduly, the reductions have been carried out with values for the proper motions found from the available meridian positions, which we believe to be sufficiently accurate not to affect the resulting parallax more than 0″.02.

The data in the usual form are as follows: —

Lalande 19896	B. D. +3°, 2338	Mag. 7.8	R. A. 10^h 6.6^m	Decl. +3° 25′	Pos. Angle.
a	+3°, 2321	7.7	10 1.9	3 5	235°.8
b	+4°, 2313	8.5	10 13.0	4 21	73°.6

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 May 25	13 3	2	62	401.989	472.104	+0.008	−0.003	874.098
27	13 29	3	72.5	.958	.082	.008	.003	.045
June 1	13 28	3	59.5	.963	.080	.008	.003	.048
2	13 33	2–3	59.5	951	.088	.008	.003	.044
1908 Nov. 28	7 21	2–3	34	401.972	472.080	+0.001	−0.000	874.053
Dec. 1	8 5	3–4	32	.960	.071	.001	000	.032
2	8 31	1–2	18.5	937	.040	.001	.000	873.978
5	8 4	3	15.5	.947	.040	.001	.000	.988
7	7 19	3	22.5	.942	.060	.001	.000	874.003
8	8 14	3	22.5	.944	.039	.001	.000	873.984
9	7 34	3–4	19	.986	.094	.001	.000	874.081
20	8 28	3–4	25.5	.940	.030	.000	.000	873.970
1909 May 2	13 0	3	41.5	401.966	472.050	−0.004	+0.002	874.014
3	12 50	1–2	52.5	.964	.059	.004	.002	.021
4	12 36	3	48.5	.976	.066	.004	.002	.040
11	12 35	3	51	.954	.046	.005	.002	873.997
1909 Dec. 6	7 1	2	28	401.940	472.028	−0.012	+0.005	873.961
6	7 25	2	28	.960	.064	.012	.005	874.017
7	6 55	2	37	.963	.041	.012	.005	873.997
7	7 30	2	37	.982	.063	.012	.005	874.038
8	7 4	2–3	21	.954	.055	.012	.005	.002
8	7 25	2–3	21	.944	.022	.012	.005	873.959
				Assumed Annual Proper Motion and Mean Sum:		+0.013	−0.005	874.016

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. Solution A. R	Solution B. R
S.	70.115	−0.007	70.097	$+1.0\,x_1$	$+1.34\,y_1$	$-0.60\,z$ =	−0.007	−0.012	−0.008
	.124	− .002	.111	1.0	1.34	0.60	+ .007	+ .002	+ .006
	.117	− .003	.103	1.0	1.31	0.58	− .001	− .006	− .002
	.137	− .002	.124	1.0	1.30	0.58	+ .020	+ .015	+ .019

Lalande 19896 — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. Solution A. R	Residuals. Solution B. R
S.	70.108	−0.003	70.104	$+1.0\,x_1$	$-1.25\,y_1$	$-0.09\,z$	$=+0.000$	+0.001	−0.002
	.111	− .001	.109	1.0	1.23	0.08	+ .005	+ .006	+ .003
	103	+ .003	.105	1.0	1.22	0.08	+ .001	+ .002	− .001
	.093	+ .002	.094	1.0	1.20	0.07	− .010	− .009	− .012
	.118	+ .001	.118	1.0	1.18	0.07	+ .014	+ .015	+ .013
	.095	+ .003	.097	1.0	1.17	0.06	− .007	− .006	− .008
	.108	− .005	.102	1.0	1.16	0.06	− .002	− .001	− .003
	.090	+ .004	.094	1.0	1.04	0.03	− .010	− .009	− .011
S.	70.084	+0.000	70.090	$1.0\,x_2$	$+1.32\,y_2$	$+0.33\,z$	$=-0.014$	−0.007	−0.012
	.095	− .000	.101	1.0	1.33	0.34	− .003	+ .004	− .001
	.090	− .002	.094	1.0	1.34	0.34	− .010	− .003	− .008
	.092	+ .002	.101	1.0	1.37	0.36	− .003	+ .004	− .001
S.	70.088	+0.004	70.109	$+1.0\,x_2$	$-1.19\,y_2$	$+0.93\,z$	$=+0.005$	+0.002	+0.005
	.104	− .000	.121	1.0	1.19	0.93	+ .017	+ .014	+ .017
	.078	+ .002	.097	1.0	1.18	0.93	− .007	− .010	− .007
	.081	− .002	.096	1.0	1.18	0.93	− .008	− .011	− .008
	.101	+ .001	.119	1.0	1.17	0.94	+ .015	+ .012	+ .015
	.078	+ .005	.100	1.0	1.17	0.94	− .004	− .007	− .004

Assumed Mean Difference: 70.104

Normals:

					R
$+12.00\,x_1$	$+0.00\,x_2$	$-4.16\,y_1$	$+0.00\,y_2$	$-2.90\,z$	$=+0.010$
$+0.00$	$+10.00$	$+0.00$	-1.72	$+6.97$	$=-0.012$
-4.16	$+0.00$	$+18.21$	$+0.00$	-2.47	$=+0.033$
$+0.00$	-1.72	$+0.00$	$+15.55$	-4.78	$=-0.061$
-2.90	$+6.97$	-2.47	-4.78	$+7.16$	$=+0.004$

$[nn] = 0.00196$

Solution A

	R		R	
$x_1 =$	$+0.0016$	$+0.313\,z$	± 0.0019	Wt. 11.0
$x_2 =$	-0.0019	$-0.657\,z$	± 0.0020	9.8
$y_1 =$	$+0.0022$	$+0.207\,z$	± 0.0016	16.8
$y_2 =$	-0.0041	$+0.235\,z$	± 0.0016	15.2

$[vv] = 0.00158$ Prob. Error 1 Eq. $= \pm 0''.081$

$\pi = -0''.012 \quad \pm 0''.014$

Solution B

	R		R	
$x_1 =$	$+0.0006$	$+0.318\,z$	± 0.0020	Wt. 11.5
$x_2 =$	-0.0013	$-0.660\,z$	± 0.0022	9.9
$y =$	-0.0008	$+0.220\,z$	± 0.0012	32.0

$[vv] = 0.00188$ Prob. Error 1 Eq. $= \pm 0''.086$

$\pi = -0''.010 \quad \pm 0''.015$

When the small number of measures in the two groups is considered the agreement of the two y values in *Solution A* appears sufficient, and hence *Solution B* is adopted. The previous value found from a single star series was

S. $\pi = -0''.134 \quad \pm 0''.028$ Wt. 6.0 Prob. Error 1 Obs. $\pm 0''.067$ 14 Obs.

and the combination according to the method adopted leads to the values:—

Method α: $\pi = -0''.072 \quad \pm 0''.021$

" β: $\pi = -0.063 \quad \pm 0.015$

" γ: $\pi = -0.038 \quad \pm 0.013$

and the final result is

Lalande 19896: $\pi = -0''.058 \pm 0''.016$

33 Virginis	B. D. +10°, 2468	Mag. 6.4	R. A. 12h 39.0m	Decl. +10° 22′	Pos. Angle.
a	+10°, 2461	8.1	12 36.0	10 54	306°.0
b	+ 9°, 2675	8.2	12 41.0	9 54	132°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 June 12	15 20	1–2	65	266.185	186.853	+0.022	−0.023	453.037
12	15 54	1–2	64	.191	.843	.022	.023	.033
13	14 53	1–2	64.5	.190	.851	.021	.023	.039
13	15 30	1–2	63.5	.197	.848	.021	.023	.043
14	15 8	3–4	66.5	.201	.851	.021	.023	.050
14	15 58	3–4	66	.185	.859	.021	.023	.042
1908 Nov. 28	9 52	2–3	32	266.176	186.800	+0.004	−0.004	452.976
28	10 36	2–3	31	.187	.801	.004	.004	.988
Dec. 1	9 26	3–4	29.5	.183	.783	.004	.004	.966
1	10 7	3–4	28	.166	.813	.004	.004	.979
7	9 27	1–2	31	.204	.826	.003	.003	453.030
7	10 7	1–2	30.5	.205	.828	.003	.003	.033
8	9 26	3	22.5	.207	.803	.003	.003	.010
8	10 9	3	22	.190	.808	.003	.003	452.998
12	9 32	2	22.5	.200	.808	.002	.002	453.008
12	10 12	2	22.5	.188	.821	.002	.002	.009
21	9 43	3	24.5	.181	.814	.001	.001	452.995
21	10 23	3	24	.207	.823	.001	.001	453.030
1909 May 24	15 24	3–4	59.5	266.194	186.795	−0.015	+0.016	452.990
24	16 3	3–4	58	.210	.793	.015	.016	453.004
25	14 57	1–2	48.5	.216	.802	.016	.016	.018
25	15 27	1–2	48	.210	.796	.016	.016	.006
30	14 30	2	59.5	.195	.799	.016	.017	452.995
30	15 7	2	59	.212	.804	.016	017	453.017
1909 Dec. 9	9 8	2–3	19	266.219	186.749	−0.037	+0.039	452.970
9	9 43	2–3	18.5	.210	.752	.037	.039	.964
11	9 10	2	18.5	.210	.763	.037	.039	.975
11	9 46	2	18.5	.234	.750	.037	.039	.986
18	9 4	2–3	20.5	.215	.756	.037	.039	.973
18	9 52	2–3	19.5	.217	.773	.037	.039	.992
				Assumed Annual Proper Motion and Mean Sum:		+0.039	−0.041	453.020

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals.
C.	79.332	−0.003	79.374	$+1.0\,x_1 - 1.92\,y - 0.56\,z =$			−0.011	−0.006
	.348	− .002	.391	1.0	1.92	0.56	+ .006	+ .011
	.339	− .003	.380	1.0	1.92	0.55	− .005	− .000
	.349	− .004	.389	1.0	1.92	0.55	+ .004	+ .009
	.350	− .005	.389	1.0	1.93	0.55	+ .004	+ .009
	.326	− .004	.366	1.0	1.93	0.55	− .019	− .014
C.	79.376	+0.008	79.392	$+1.0\,x_1 + 1.73\,y - 0.09\,z =$			+0.007	+0.002
	.386	+ .006	.400	1.0	1.73	0.09	+ .015	+ .010
	.400	+ .009	.417	1.0	1.76	0.09	+ .032	+ .027
	.353	+ .007	.368	1.0	1.76	0.09	− .017	− .022
	.378	− .002	.382	1.0	1.82	0.07	− .003	− .008
	.377	− .002	.381	1.0	1.82	0.07	− .004	− 009
	.404	+ .002	.412	1.0	1.83	0.07	+ .027	+ .022
	.382	+ .004	.392	1.0	1.83	0.07	+ .007	+ .002
	.392	+ .002	.398	1.0	1.87	0.06	+ .013	+ .008
	.367	+ .002	.373	1.0	1.87	0.06	− .012	− .017
	.367	+ .004	.373	1.0	1.89	0.03	− .012	− .017
	.384	− .002	.384	1.0	1.89	0.03	− .001	− .006

33 Virginis — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	79.399	+0.005	79.373	$+1.0\,x_2$	$-1.72\,y$	$+0.39\,z$	$=-0.012$	−0.007
	.417	+ .003	.389	1.0	1.72	0.39	+ .004	+ .009
	.414	+ .000	.382	1.0	1.73	0.40	− .003	+ .002
	.414	+ .002	.384	1.0	1.73	0.40	− .001	+ .004
	.396	+ .004	.367	1.0	1.80	0.41	− .018	− .013
	.408	+ .001	.376	1.0	1.80	0.41	− .009	− .004
C	79.470	+0.009	79.403	$+1.0\,x_2$	$+1.84\,y$	$+0.94\,z$	$=+0.018$	+0.013
	.458	+ .010	.392	1.0	1.84	0.94	+ .007	+ .002
	.447	+ .008	.379	1.0	1.86	0.95	− .006	− .011
	.484	+ .006	.414	1.0	1.86	0.95	+ .029	+ .024
	.459	+ .008	.391	1.0	1.90	0.96	+ .006	+ .001
	.444	+ .005	.373	1.0	1.90	0.96	− .012	− .017

Assumed Mean Difference: 79.385

Normals:

				R	
$+18.00\,x_1$	$+\ 0.00\,x_2$	$+\ 10.26\,y$	$-\ 4.14\,z$	$=+0.032$	
$+\ 0.00$	$+12.00$	$+\ 0.70$	$+\ 8.10$	$=+0.003$	
$+10.26$	$+\ 0.70$	$+101.14$	$+11.36$	$=+0.276$	
$-\ 4.14$	$+\ 8.10$	$+\ 11.36$	$+\ 8.24$	$=+0.019$	$[nn] = 0.00543$

Solution A

	R		R	
x_1	$=+0.0002$	$+0.309\,z$	± 0.0022	Wt. 16.28
x_2	$=+0.0001$	$-0.668\,z$	± 0.0025	12.00
y	$=+0.0027$	$-0.138\,z$	± 0.0009	95.25

$[vv] = 0.00462$ Prob. Error 1 Eq. $= \pm 0''.112$

$\pi = +0''.034 \quad \pm 0''.011$

Solution B

	R	R	
x	$=+0.0002$	± 0.0017	Wt. 27.75
y	$=+0.0027$	± 0.0009	84.40
z	$=-0.0002$	± 0.0034	6.71

$[vv] = 0.00468$ Prob. Error 1 Eq. $= \pm 0''.112$

$\pi = +0''.034 \quad \pm 0''.011$

Adopted: $\pi = +0''.034 \quad \pm 0''.011$

The result from our earlier survey, viz., −0″.124, was derived from only twelve rather discordant observations, and the direct solution gave the abnormally large probable error of ±0″.051. Hence the demand for this more accurate and more extended investigation. Giving the former determination, however, its proper weight and combining the two results in the adopted manner we have: —

C.	Series I_1:	$\pi = -0''.124$	$\pm 0''.051$	Wt. 33.4	Prob. Error 1 Obs.	$\pm 0''.299$	12 Obs.
C.	" I_2:	$\pi = +0''.034$	$\pm 0''.012$	84.4		$\pm 0''.112$	30

Method α: $\pi = -0''.045 \quad \pm 0''.017$

" β: $\pi = -0''.011 \quad \pm 0''.019$

" γ: $\pi = +0''.026 \quad \pm 0''.012$

whence we have the final value: —

33 Virginis: $\pi = -0''.010 \pm 0''.016$

5 Serpentis	B. D. +2°, 2944	Mag. 5.0	R. A. $15^h\ 12.0^m$	Decl. +2° 19′	Pos. Angle.
a	+1°, 3051	8.7	15 8.6	1 43	234°.7
b	+2°, 2952	8.6	15 15.4	2 44	64°.6

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum R
1907	Feb. 25	12	24	3–4	10.5	293.583	273.089	+0.008	−0.018	566.662
	Mar. 6	12	51	3	16	.549	.082	.007	.017	.621
	11	12	37	3	27	.544	.068	.007	.017	.602
	15	13	45	3–4	34.5	.580	.096	.007	.017	.666
1907	July 21	16	30	2–3	70	293.550	273.066	+0.004	−0.009	566.611
	23	17	22	2–3	72	.570	.062	.004	.009	.627
	27	17	25	3	67	.575	.089	.004	.009	.659
	Aug. 13	17	42	3–4	70.5	.573	.076	.003	.008	.644
	14	18	39	3	66	.593	.097	.003	.008	.685
	15	18	29	3	66.5	.569	.084	.003	.008	.648
	19	18	8	3–4	63.5	.577	.100	.003	.008	.672
	20	18	30	3–4	71	.596	.106	.003	.008	.697
1908	Feb. 17	13	36	1–2	17	293.585*	273.083*	−0.001	+0.003	566.670
	Mar. 7	13	6	3	32	.567*	.052*	.002	.004	.621
	12	13	1	2	37.5	.597*	.074*	.002	.004	.673
	22	13	22	2	26.5	.553*	.043*	.002	.005	.599
	Assumed Annual Proper Motion and Mean Sum:							+0.009	−0.021	566.647

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	20.494	−0.001	20.519	+1.0 *x*	+1.41 *y*	−0.85 *z* =	+0.015	+0.014
	.467	+ .001	.492	1.0	1.39	0.82	− .012	− .013
	.476	+ .002	.502	1.0	1.38	0.81	− .002	− .003
	.484	− .001	.507	1.0	1.35	0.80	+ .003	+ .002
S.	20.484	+0.001	20.498	+1.0 *x*	−1.21 *y*	−0.45 *z* =	−0.006	−0.004
	.508	+ .001	.522	1.0	1.23	0.44	+ .018	+ .020
	.486	− .000	.499	1.0	1.28	0.43	− .005	− .003
	.497	+ .000	.508	1.0	1.42	0.38	+ .004	+ .006
	.496	− .001	.506	1.0	1.42	0.38	+ .002	+ .004
	.485	− .000	.496	1.0	1.43	0.38	− .008	− .006
	.477	− .001	.487	1.0	1.44	0.37	− .017	− .015
	.490	− .002	.499	1.0	1.44	0.37	− .005	− .003
S.	20.502	−0.001	20.497	+1.0 *x*	+1.41 *y*	+0.13 *z* =	−0.007	−0.010
	.515	+ .001	.510	1.0	1.39	0.18	+ .006	+ .003
	.523	− .001	.516	1.0	1.37	0.20	+ .012	+ .009
	.510	+ .002	.505	1.0	1.29	0.22	+ .001	− .002
	Assumed Mean Difference:		20.504					

Normals:

			R
+16.00 *x*	+ 0.12 *y*	−5.75 *z* =	−0.001
+ 0.12	+29.93	+0.75 =	+0.044
− 5.75	+ 0.75	+4.10 =	+0.004

Solution:

	R	R	
x =	+0.0004	±0.0007	Wt. 7.9
y =	+0.0014	±0.0012	29.6
z =	+0.0014	±0.0044	2.0

$[nn] = 0.00139$ $[vv] = 0.00131$ Prob. Error 1 Eq. = ±0″.080

$\pi = +0''.018 \pm 0''.015$

5 Serpentis	B. D. +2°, 2944	Mag. 5.0	R. A. $15^h\ 12.0^m$	Decl. +2° 19′	Pos. Angle.
c	+2°, 2928	8.8	15 5.8	2 26	274°.2
d	+2°, 2957	8.6	15 17.7	2 1	101°.0

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Mar. 6	12	27	3	16	434.877	414.796	+0.045	−0.020	849.698
7	14	7	1	15	.840	.760	.045	.020	.625
11	13	2	3	25	.829	.781	.045	.020	.635
20	12	47	2	28.5	.877	.788	.043	.019	.689
1907 July 21	16	53	3	69	434.832	414.751	+0.025	−0.011	849.597
23	16	59	2–3	72	.879	.772	.024	.011	.664
27	17	48	3	67	.846	.797	.024	.011	.656
30	18	3	3–4	71	.871	.793	.023	.010	.677
Aug. 13	18	9	3–4	70	.870	.831	.021	.009	.713
15	18	7	3	67.5	.882	.788	.021	.009	.682
19	18	36	3–4	63	.870	.778	.020	.009	.659
20	18	8	3–4	71	.875	.785	.020	.009	.671
1908 Feb. 17	13	3	1–2	17	434.922*	414.761*	−0.007	+0.003	849.679
Mar. 12	13	26	2	37.5	.923*	.769*	.011	.005	.686
21	13	10	3	39	.905*	.753*	.012	.006	.652
22	13	1	2	27.5	.895*	.743*	.012	.006	.632
Assumed Annual Proper Motion and Mean Sum:							+0.055	−0.025	849.663

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	20.081	−0.001	20.145	$+1.0\,x + 1.70\,y - 0.82\,z =$	+0.021	+0.005
	.080	+ .001	.146	1.0 1.69 0.82	+ .022	+ .006
	.048	+ .001	.114	1.0 1.63 0.81	− .010	− .025
	.089	− .001	.150	1.0 1.50 0.78	+ .026	+ .012
S.	20.081	+0.002	20.119	$+1.0\,x - 1.88\,y - 0.45\,z =$	−0.005	+0.008
	.107	− .000	.142	1.0 1.90 0.44	+ .018	+ .031
	.049	+ .000	.084	1.0 1.93 0.43	− .040	− .027
	.078	− .000	.111	1.0 1.95 0.42	− .013	− .000
	.039	− .001	.068	1.0 1.98 0.38	− .056	− .042
	.094	− .000	.124	1.0 1.98 0.38	− .000	+ .014
	.092	+ .000	.121	1.0 1.96 0.37	− .003	+ .011
	.090	− .000	.119	1.0 1.96 0.37	− .005	+ .009
S.	20.161	−0.000	20.151	$+1.0\,x + 1.90\,y + 0.13\,z =$	+0.027	+0.010
	.154	− .001	.137	1.0 1.62 0.20	+ .013	− .002
	.152	+ .000	.134	1.0 1.46 0.22	+ .010	− .004
	.152	+ .001	.135	1.0 1.43 0.22	+ .011	− .003
Assumed Mean Difference:			20.124			

Normals:

			R	
+16.00 *x*	− 2.61 *y*	−5.70 *z*	= +0.016	Wt. 8.0
− 2.61	+51.24	+2.23	= +0.403	50.0
− 5.70	+ 2.23	+4.08	= +0.004	2.0

Solution:

	R	R
$x =$	+0.0021	±0.0042
$y =$	+0.0080	±0.0017
$z =$	−0.0001	±0.0086

$[nn] = 0.00811$ $[vv] = 0.00486$ Prob. Error 1 Eq. = ±″0.154

$\pi = +″0.102$ ±″0.022

The older value found from the pair *a b*, observed by ELKIN and SMITH jointly, was

E. S. $\pi = +″0.200$ ±″0.047 Wt. 19.5 Prob. Error 1 Obs. ±″0.208 14 Obs.

The three series give the combined values: —

Method α: $\pi = +0''.107 \pm 0''.016$
" β: $\pi = +0.096 \pm 0.015$
" γ: $\pi = +0.055 \pm 0.012$

and the final result: —

5 Serpentis: $\pi = +0''.086 \pm 0''.014$

Weisse 17h, 322 — CHASE. The large and accordant values found by me for the parallax of this star from my first three series (v. pp. 126–130) and the strangely discordant result from my fourth series, Series III_1, with respect to these and likewise with respect to the next two series where the same comparison stars were used, were very perplexing and I could not bring myself to drop the matter until I had added yet one more series. Furthermore, to furnish some evidence that these discrepancies could not be due to a measurable parallax of one or both of the comparison stars, as was suggested by a careful critic of our work, I tested each of these latter also for parallax.

The complete data for these last three series follow: —

Weisse 17h, 322	B. D. +2°, 3312	Mag. 8.0	R. A. 17h 18.5m	Decl. +2° 17′	Pos. Angle.
e	+2°, 3295	8.6	17 12.3	2 43	285°.5
f	+1°, 3450	7.2	17 24.2	1 47	108°.9

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *e*. R	Distance *f*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Oct. 15	19 58	2	47	455.104*	425.837*	−0.003	+0.004	880.942
15	20 27	2	46	.106*	.838*	.003	.004	.945
16	19 49	3	51.5	.104*	.846*	.003	.003	.950
16	20 28	3	51	.117*	.865*	.003	.003	.982
18	20 19	3–4	50	.125*	.859*	.003	.003	.984
1908 Mar. 9	14 26	3	19	455.098	425.852	+0.003	−0.003	880.950
12	14 32	2	36	.149	.857	.003	.003	881.006
12	15 11	2	36	.126	.843	.003	.003	880.969
24	15 1	3	33.5	.147	.864	.003	.004	881.010
26	15 3	3	45.5	.122	.832	.003	.004	880.953
Apr. 2	14 57	3	28.5	.148	.853	.004	.004	881.001
6	15 38	3	42	.110	.834	.004	.004	880.944
9	15 4	2	30.5	.122	.858	.004	.004	.980
14	14 56	2	37	.140	.848	.004	.004	.988
16	14 38	2	28	.162	.868	.004	.005	881.029
1908 Oct. 15	20 15	3	63.5	455.085	425.868	+0.012	−0.013	880.952
15	20 48	3	63	.115	.861	.012	.013	.975
17	19 58	2	65	.133	.880	.012	.013	881.012
17	20 35	2	64.5	.155	.890	.012	.013	.044
Nov. 3	20 47	3–4	50	.095	.861	.013	.013	880.956
					Assumed Annual Propef Motion and Mean Sum:	−0.015	+0.016	880.980

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	29.267	+0.001	29.261	+1.0	−1.48 *y*	−0.22 *z* =	−0.019	+0.004
	.268	+ .001	.262	1.0	1.48	0.22	− .018	+ .005
	.258	+ .001	.253	1.0	1.46	0.21	− .027	− .004
	.252	− .000	.246	1.0	1.46	0.21	− .034	− .011
	.266	− .000	.260	1.0	1.42	0.21	− .020	+ .003
C.	29.246	+0.001	29.253	+1.0 *x*	+1.92 *y*	+0.18 *z* =	−0.027	−0.036
	.292	− .001	.297	1.0	1.90	0.19	+ .017	+ .008

Weisse 17h, 322 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	29.283	+0.000	29.289	+1.0 x	+1.90 y	+0.19 z	= +0.009	+0.000
	.283	− .001	.289	1.0	1.81	0.22	+ .009	+ .000
	.290	+ .001	.298	1.0	1.77	0.23	+ .018	+ .010
	.295	− .001	.302	1.0	1.68	0.25	+ .022	+ .014
	.276	+ .001	.285	1.0	1.63	0.26	+ .005	− .003
	.264	.000	.272	1.0	1.58	0.27	− .008	− .015
	.292	− .000	.300	1.0	1.47	0.28	+ .020	+ .013
	.294	− .002	.301	1.0	1.42	0.29	+ .021	+ .015
C.	29.217	+0.001	29.243	+1.0 x	−1.48 y	+0.79 z	= −0.037	−0.026
	.254	+ .000	.279	1.0	1.48	0.79	− .001	+ .010
	.253	− .001	.277	1.0	1.44	0.79	− .003	+ .008
	.265	− .002	.288	1.0	1.44	0.79	+ .008	+ .019
	.234	+ .001	.261	1.0	1.00	0.84	− .019	− .012

Assumed Mean Difference: 29.280

			R		R	R	
Normals:	+20.00 x	+ 2.94 y	+5.29 z = −0.084	*Solution:*	x = −0.0087	±0.0029	Wt. 12.85
	+ 2.94	+49.66	+0.09 = +0.378		y = +0.0081	±0.0015	49.06
	+ 5.29	+ 0.09	+4.00 = +0.004		z = +0.0124	±0.0064	2.59

$[nn]$ = 0.00769 $[vv]$ = 0.00382 Prob. Error 1 Eq. = ±0.″128

π = +0.″103 ±0.″018

Star *e* (W. 17h, 322)	B. D. +2°, 3295	Mag. 8.6	R. A. 17h 12.3m	Decl. +2° 43′	Pos. Angle.
a	+2°, 3265	8.9	17 5.0	2 51	274°.7
b	+2°, 3318	9.0	17 19.6	2 28	97°.1

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Oct. 21	20 21	2–3	36	523.356 *	521.301 *	0.000	0.000	1044.657
21	20 55	2–3	36	.411 *	.310 *	.000	.000	.721
23	20 40	3–4	46	.361 *	.295 *	.000	.000	.656
1908 Mar. 9	15 21	3	18	523.382	521.323	0.000	0.000	1044.705
26	16 5	3	45	.364	.344	.000	.000	.708
Apr. 2	15 53	3	28	.384	.326	.000	.000	.710
6	14 52	3	43	.398	.327	.000	.000	.725
9	15 52	2	30	.379	.291	.000	.000	.670
16	15 23	2	27.5	.400	.330	.000	.000	.730
1908 Oct. 20	20 57	3–4	41	523.472	521.372	0.000	0.000	1044.844
21	20 40	2–3	46.5	.435	.348	.000	.000	.783
22	20 21	3–4	51	.424	.327	.000	.000	.751
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	1044.700

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
C.	2.055	+0.000	2.055	+1.0 x	−1.48 y	−0.20 z	= −0.025	−0.019
	.101	− .000	.101	1.0	1.48	0.20	+ .021	+ .027
	.066	+ .000	.066	1.0	1.43	0.19	− .014	− .008
C.	2.059	−0.000	2.059	+1.0 x	+1.96 y	+0.18 z	= −0.021	+0.001
	.020	− .000	.020	1.0	1.86	0.23	− .060	− .040
	.058	− .000	.058	1.0	1.77	0.25	− .022	− .003
	.071	− .000	.071	1.0	1.72	0.26	− .009	+ .010
	.088	+ .000	.088	1.0	1.68	0.27	+ .008	+ .026
	.070	− .000	.070	1.0	1.54	0.29	− .010	+ .007

Star *e* (W. 17h, 322) — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
C.	2.100	−0.000	2.100	$+1.0\,x - 1.49\,y + 0.80\,z = +0.020$	+0.004
	.087	− .000	.087	1.0 1.48 0.80 + .007	− .009
	.097	− .000	.097	1.0 1.45 0.80 + .017	+ .001
	Assumed Mean Difference:		2.080		

	R		R	R	
Normals:	$+12.00\,x + 1.72\,y + 3.29\,z = -0.088$	*Solution:*	$x = -0.0123$	±0.0050	Wt. 7.41
	$+1.72 + 31.51 - 0.09 = -0.248$		$y = -0.0071$	±0.0024	31.05
	$+3.29 - 0.09 + 2.41 = +0.013$		$z = +0.0220$	±0.0112	1.50

$[nn] = 0.00677$ $[vv] = 0.00366$ Prob. Error 1 Eq. = ±0″.172

$\pi = -0''.090 \pm 0''.031$

Star *f* (W. 17h, 322) B. D. +1°, 3450 Mag. 7.2 R. A. 17h 24.2m Decl. +2° 0′ Pos. Angle.

a	+2°, 3297	8.5	17 18.9	2 13	287°.7
b	+1°, 3467	7.9	17 29.0	1 19	110°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 Oct. 24	20 14	2–3	40	394.320 *	363.366 *	0.000	0.000	757.686
24	20 49	2–3	40	.298 *	.367 *	.000	.000	.665
26	20 33	2	38	.311 *	.383 *	.000	.000	.694
1908 Mar. 12	15 55	2	35.5	394.358	363.411	0.000	0.000	757.769
24	16 37	3	32.5	.338	.393	.000	.000	.731
Apr. 2	16 34	3	28	.315	.367	.000	.000	.682
6	16 17	3	41	.297	.372	.000	.000	.669
9	16 35	2	30	.321	.373	.000	.000	.694
16	15 59	2	27	.347	.377	.000	.000	.724
1908 Oct. 20	20 15	3–4	41.5	394.341	363.397	0.000	0.000	757.738
21	20 8	2–3	47	.337	.404	.000	.000	.741
Nov. 1	20 39	3–4	36.5	.320	.374	.000	.000	.694
	Assumed Annual Proper Motion and Mean Sum:					0.000	0.000	757.700

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
C.	30.954	+0.001	30.955	$+1.0\,x - 1.30\,y - 0.19\,z = +0.015$	+0.017
	.931	+ .001	.932	1.0 1.30 0.19 − .008	− .006
	.928	+ .000	.928	1.0 1.24 0.18 − .012	− .010
C.	30.947	−0.003	30.944	$+1.0\,x + 1.88\,y + 0.19\,z = +0.004$	−0.003
	.945	− .001	.944	1.0 1.80 0.22 + .004	− .003
	.948	+ .001	.949	1.0 1.68 0.25 + .009	+ .002
	.925	+ .001	.926	1.0 1.63 0.26 − .014	− .020
	.948	+ .000	.948	1.0 1.58 0.27 + .008	+ .002
	.970	− .001	.969	1.0 1.44 0.29 + .029	+ .023
C.	30.944	−0.002	30.942	$+1.0\,x - 1.39\,y + 0.80\,z = +0.002$	+0.002
	.933	− .002	.931	1.0 1.36 0.80 − .009	− .009
	.946	+ .000	.946	1.0 1.07 0.83 + .006	+ .005
	Assumed Mean Difference:		30.940		

	R		R	R	
Normals:	$+12.00\,x + 2.35\,y + 3.35\,z = +0.034$	*Solution:*	$x = +0.0018$	±0.0032	Wt. 7.21
	$+2.35 + 26.66 + 0.08 = +0.071$		$y = +0.0025$	±0.0017	25.98
	$+3.35 + 0.08 + 2.44 = +0.011$		$z = +0.0020$	±0.0071	1.50

$[nn] = 0.00177$ $[vv] = 0.00151$ Prob. Error 1 Eq. = ±0″.110

$\pi = +0''.032 \pm 0''.022$

The result for star *f*, coming out so small, and that for star *e*, a considerable negative value, do not serve to explain the lower values found in every case by Series III, nor does there yet appear any probable explanation for the abnormal result from Series III_1, unless it arises from practically all of the accidental errors of observation just happening to be thrown in the same direction.

All of the results brought together are as follows:—

CHASE.	Series	I_1:	$\pi = +0''.218$	$\pm 0''.030$	Wt. 33.6	Prob. Error 1 Obs. $\pm 0''.176$	10 Obs.
"	"	I_2:	$\pi = +0.182$	± 0.034	35.1	± 0.202	12
"	"	II:	$\pi = +0.198$	± 0.022	45.9	± 0.146	16
"	"	III_1:	$\pi = -0.047$	± 0.031	38.9	± 0.196	16
"	"	III_2:	$\pi = +0.127$	± 0.034	25.6	± 0.171	14
"	"	III_3:	$\pi = +0.170$	± 0.031	25.6	± 0.158	14
"	"	III_4:	$\pi = +0.103$	± 0.018	49.1	± 0.128	20

Using Series III_1 and combining in the adopted manner we have:—

Method α:	$\pi = +0''.136$	$\pm 0''.010$
" β:	$\pi = +0.132$	± 0.010
" γ:	$\pi = +0.135$	± 0.010

which give as the final value:—

Weisse 17h, 322: $\pi = +0''.134 \pm 0''.010$

It may be remarked that if Series III_1 be rejected the parallax result will be increased to $+0''.162$, but in the light of all the recent series it would seem that the earlier results were somewhat too large.

Weisse 20h, 1454	**B. D. +2°, 4295**	**Mag. 8.2**	**R. A. 20h 56.9m**	**Decl. +2° 26′**	**Pos. Angle.**
a	+2°, 4294	8.0	20 56.4	2 22	238°.8
b	+2°, 4297	7.5	20 57.4	2 21	115°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907	May	3	18	48	2–3	37	41.505	42.122	−0.015	+0.012	83.624
		4	18	6	2	35	.481	.116	.015	.012	.594
		11	17	55	3–4	32	.498	.109	.014	.011	.604
		13	18	41	1–2	48	.495	.101	.014	.011	.593
1907	Oct.	14	0	10	3	39	41.490	42.119	−0.005	+0.004	83.608
		15	23	54	3	40.5	.497	.116	.005	.004	.612
		16	0	8	2	47.5	.496	.116	.005	.004	.611
		18	23	39	3	44.5	.482	.114	.004	.004	.596
		20	23	50	3	42	.500	.115	.004	.004	.615
		21	23	32	3	40	.480	.101	.004	.003	.580
		22	0	11	3	37	.488	.108	.004	.003	.595
		23	22	38	2–3	41.5	.480	.103	.004	.003	.582
1908	May	18	18	15	3–4	52.5	41.463*	42.115*	+0.008	−0.007	83.579
		19	17	56	3	51.5	.479*	.140*	.008	.007	.620
		31	18	2	2–3	54.5	.470*	.140*	.009	.008	.611
	June	2	18	49	2	49.5	.474*	.128*	.009	.008	.603
								Assumed Annual Proper Motion and Mean Sum:	−0.022	+0.018	83.602

Weisse 20h, 1454 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	0.617	−0.000	0.644	+1.0 x	−1.73 y	−0.66 z	= +0.007	+0.001
	.635	+ .000	.662	1.0	1.73	0.66	+ .025	+ .019
	.611	− .000	.636	1.0	1.72	0.64	− .001	− .007
	.606	+ .000	.631	1.0	1.71	0.64	− .006	− .012
S.	0.629	−0.000	0.638	+1.0 x	+1.59 y	−0.21 z	= +0.001	+0.007
	.619	− .000	.628	1.0	1.61	0.21	− .009	− .002
	.620	− .000	.629	1.0	1.62	0.21	− .008	− .001
	.632	+ .000	.640	1.0	1.64	0.20	+ .003	+ .010
	.615	− .000	.623	1.0	1.65	0.20	− .014	− .007
	.621	+ .000	.628	1.0	1.66	0.19	− .009	− .002
	.620	+ .000	.627	1.0	1.67	0.19	− .010	− .003
	.623	+ .000	.630	1.0	1.68	0.19	− .007	− .000
S.	0.652	+0.000	0.637	+1.0 x	−1.69 y	+0.38 z	= +0.000	−0.007
	.661	− .000	.646	1.0	1.69	0.38	+ .009	+ .002
	.670	− .000	.653	1.0	1.56	0.42	+ .016	+ .010
	.654	− .000	.637	1.0	1.53	0.42	+ .000	− .006
	Assumed Mean Difference:		0.637					

Normals:

			R
+16.00 x	− 0.24 y	−2.60 z	= −0.003
− 0.24	+43.88	−0.73	= −0.171
− 2.60	− 0.73	+2.66	= +0.005

Solution:

	R	R	
x =	−0.0001	±0.0016	Wt. 13.4
y =	−0.0039	±0.0009	43.6
z =	+0.0008	±0.0039	2.2

$[nn] = 0.00163$ $[vv] = 0.00096$ Prob. Error 1 Eq. = ±0″.074

$\pi = -0''.049 \pm 0''.011$

The earlier value found by Smith from the single star *b* was

S. $\pi = -0''.134 \pm 0''.029$ Wt. 4.4 Prob. Error 1 Obs. ±0″.061 12 Obs.

Accordingly the combined values are:—

Method α: $\pi = -0''.091 \pm 0''.021$
" β: $\pi = -0''.073 \pm 0''.009$
" γ: $\pi = -0''.060 \pm 0''.010$

and the final result:—

Weisse 20h, 1454: $\pi = -0''.075 \pm 0''.013$

Weisse 21h, 97	B. D. +17°, 4519	Mag. 7.3	R. A. 21h 5.3m	Decl. +17° 10′	Pos. Angle.
a	+16°, 4469	8.2	21 3.8	16 23	204°.4
b	+18°, 4743	7.5	21 8.5	18 1	41°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 June 17	18 18	1–2	54.5	239.752	327.799	−0.036	+0.033	567.548
17	18 41	1–2	54.5	.763	.804	.036	.033	.564
18	17 12	3–4	58	.771	.801	.036	.033	.569
18	17 37	3–4	58	.764	.810	.036	.033	.571
1908 Dec. 2	0 38	1–2	23.5	239.730	327.808	−0.005	+0.005	567.538
3	0 1	1–2	26.5	.722	.816	.005	.005	.538
5	0 22	3	22	.696	.816	.005	.004	.511

Weisse 21^h, 97 — *continued.*

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance a. R	Distance δ. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Dec. 5	0 39	3	22	239.694	327.804	−0.005	+0.004	567.497
8	0 26	2	25.5	.729	.828	.004	.004	.557
8	0 52	2	25.5	.720	.822	.004	.004	.542
21	0 35	3	33.5	.732	.819	.002	.002	.551
23	1 12	2–3	17.5	.730	.836	.001	.001	.566
1909 May 25	18 23	2	45.5	239.707	327.852	+0.027	−0.025	567.561
26	18 5	3	52.5	.702	.854	.027	.025	.558
29	18 26	3	53.5	.710	.859	.027	.025	.571
June 11	17 37	2	56.5	.703	.858	.029	.027	.563
1909 Nov. 11	1 4	2	48.5	239.682	327.887	+0.058	−0.053	567.574
15	0 35	3–4	48.5	.657	.884	.058	.054	.545
18	0 55	2–3	25.5	.642	.873	.059	.055	.519
19	0 43	2	40	.657	.881	.059	.055	.542
26	0 45	2	33	.651	.874	.060	.056	.529
27	0 23	2	38.5	.645	.870	.061	.056	.520
Assumed Annual Proper Motion and Mean Sum:						−0.067	+0.062	567.547

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. Solution A. R	Solution B. R
S.	88.047	−0.000	88.116	$+1.0\,x_1$	$-1.69\,y_1$	$-0.54\,z$ =	+0.010	+0.009	+0.013
	.041	− .003	.107	1.0	1.69	0.54	+ .001	+ .000	+ .004
	.030	− .003	.096	1.0	1.69	0.54	− .010	− .011	− .007
	.046	− .004	.111	1.0	1.69	0.54	+ .005	+ .004	+ .008
S.	88.078	+0.001	88.089	$+1.0\,x_1$	$+1.66\,y_1$	$-0.08\,z$ =	−0.017	−0.019	−0.021
	.094	+ .001	.105	1.0	1.67	0.08	− .001	− .003	− .005
	.120	+ .006	.135	1.0	1.67	0.07	+ .029	+ .027	+ .025
	.110	+ .008	.127	1.0	1.67	0.07	+ .021	+ .019	+ .017
	.099	− .002	.105	1.0	1.67	0.06	− .001	− .003	− .005
	.102	+ .001	.111	1.0	1.67	0.06	+ .005	+ .003	+ .001
	.087	− .001	.090	1.0	1.62	0.03	− .016	− .018	− .020
	.106	− .003	.105	1.0	1.61	0.02	− .001	− .003	− .005
S.	88.145	−0.002	88.091	$+1.0\,x_2$	$-1.68\,y_2$	$+0.40\,z$ =	−0.015	−0.004	−0.008
	.152	− .002	.098	1.0	1.69	0.40	− .008	+ .003	− .001
	.149	− .004	.093	1.0	1.72	0.41	− .013	− .001	− .006
	.155	− .002	.097	1.0	1.70	0.44	− .009	+ .003	− .002
S.	88.205	−0.005	88.089	$+1.0\,x_2$	$+1.49\,y_2$	$+0.86\,z$ =	−0.017	−0.020	−0.017
	.227	+ .000	.115	1.0	1.54	0.87	+ .009	+ .005	+ .008
	.231	+ .004	.121	1.0	1.57	0.88	+ .015	+ .011	+ .014
	.224	+ .001	.111	1.0	1.58	0.88	+ .005	+ .001	+ .004
	.223	+ .003	.110	1.0	1.65	0.90	+ .004	+ .000	+ .003
	.225	+ .004	.112	1.0	1.65	0.91	+ .006	+ .002	+ .005
Assumed Mean Difference:			88.106						

Normals:

				R
$+12.00\,x_1$	$+\ 0.00\,x_2$	$+\ 6.48\,y_1$	$+\ 0.00\,y_2$	$-2.63\,z$ = +0.024
+ 0.00	+10.00	+ 0.00	+ 2.69	+6.95 = −0.023
+ 6.48	+ 0.00	+33.36	+ 0.00	+2.86 = +0.023
+ 0.00	+ 2.69	+ 0.00	+26.52	+5.56 = +0.114
− 2.63	+ 6.95	+ 2.86	+ 5.56	+6.54 = −0.004

$[nn] = 0.00327$

Weisse 21h, 97 — *continued.*

Solution A				*Solution B*			
	R	R			R	R	
x_1 =	+0.0018	+0.296 z ±0.0025	Wt. 10.7	x_1 =	+0.0007	+0.296 z ±0.0024	Wt. 11.3
x_2 =	−0.0035	−0.657 z ±0.0026	9.7	x_2 =	−0.0029	−0.655 z ±0.0026	9.9
y_1 =	+0.0003	−0.144 z ±0.0015	29.9	y =	+0.0023	−0.143 z ±0.0011	55.7
y_2 =	+0.0047	−0.143 z ±0.0016	25.8				
[*vv*] = 0.00260		Prob. Error 1 Eq. = ±″0.103		[*vv*] = 0.00281		Prob. Error 1 Eq. = ±″0.104	
		π = +″0.032 ±″0.014				π = +″0.029 ±″0.014	

Solution B is here again clearly sufficient. The former value by ELKIN from the same pair of stars was

E. π = −″0.127 ±″0.041 Wt. 29.4 Prob. Error 1 Obs. ±″0.220 11 Obs.

With the plan followed the combinations give the values:—

Method *a*: π = −″0.049 ±″0.021
" *β*: π = +0.011 ±0.014
" *γ*: π = +0.013 ±0.013

and the final result:—

Weisse 21h, 97: π = −″0.008 ± ″0.016

Lalande 46650	**B. D. +1°, 4774**	**Mag. 8.9**	**R. A. 23h 41.6m**	**Decl. +1° 37′**	**Pos. Angle.**
a	+1°, 4764	8.5	23 36.7	1 20	257°.3
b	+1°, 4799	8.2	23 47.0	1 40	88°.4

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 June 29	21 55	3	48.5	360.039*	377.234*	+0.040	−0.023	737.290
July 3	21 26	2	53.5	.022*	.227*	.039	.023	.265
4	21 2	3	58.5	.045*	.229*	.039	.023	.290
23	21 12	2–3	66.5	.054*	.254*	.035	.020	.323
1907 Nov. 25	0 5	3	31	360.069	377.244	+0.008	−0.005	737.316
27	2 17	3–4	30.5	.045	.242	.008	.005	.290
28	2 35	3–4	40.5	.045	.249	.007	.004	.297
30	1 52	3–4	29	.034	.213	.007	.004	.250
Dec. 1	2 30	3–4	24	.045	.212	.006	.004	.259
2	1 6	3–4	23.5	.062	.254	.006	.004	.318
5	0 45	3	24.5	.052	.246	.006	.003	.301
7	1 51	3–4	33	.045	.222	.006	.003	.270
1908 July 15	21 11	3–4	60	360.148	377.172	−0.043	+0.025	737.302
Aug. 14	21 11	3–4	64	.110	.200	.049	.028	.289
18	21 5	3–4	64	.123	.170	.049	.029	.273
20	20 47	3–4	56	.142	.218	.049	.029	.340
23	22 50	3–4	60	.114	.164	.050	.029	.257
				Assumed Annual Proper Motion and Mean Sum:		+0.079	−0.046	737.290

Lalande 46650 — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	17.195	+0.000	17.132	$+1.0x - 1.87y - 0.51z =$	−0.025	+0.000
	.205	+ .001	.144	1.0 1.84 0.50	− .013	+ .012
	.184	+ .000	.122	1.0 1.83 0.50	− .035	− .010
	.200	− .001	.144	1.0 1.56 0.44	− .013	+ .009
S.	17.175	−0.001	17.161	$+1.0x + 1.75y - 0.10z =$	+0.004	−0.015
	.197	+ .000	.184	1.0 1.77 0.10	+ .027	+ .008
	.204	− .000	.193	1.0 1.77 0.09	+ .036	+ .017
	.179	+ .001	.169	1.0 1.79 0.09	+ .012	− .007
	.167	+ .001	.158	1.0 1.80 0.08	+ .001	− .018
	.192	− .001	.181	1.0 1.81 0.08	+ .024	+ .005
	.194	− .001	.184	1.0 1.83 0.07	+ .027	+ .008
	.177	+ .000	.168	1.0 1.84 0.07	+ .011	− .009
S.	17.024	−0.000	17.092	$+1.0x - 1.71y + 0.54z =$	−0.065	−0.034
	.090	+ .000	.167	1.0 1.09 0.62	+ .010	+ .034
	.047	+ .000	.127	1.0 0.99 0.63	− .030	− .007
	.076	− .001	.153	1.0 0.92 0.63	− .004	+ .018
	.050	+ .001	.130	1.0 0.83 0.64	− .027	− .005
	Assumed Mean Difference:		17.157			

Normals: (R)

$+17.00x + 1.72y + 0.43z = -0.061$

$+1.72x + 45.08y - 1.07z = +0.566$

$+0.43x - 1.07y + 2.89z = -0.038$

Solution: (R, R)

$x = -0.0047 \pm 0.0028$ Wt. 16.9

$y = +0.0128 \pm 0.0018$ 44.5

$z = -0.0077 \pm 0.0070$ 2.8

$[nn] = 0.01183$ $[vv] = 0.00417$ Prob. Error 1 Eq. = $\pm 0''.148$

$\pi = +0''.162 \pm 0''.022$

Lalande 46650 **B. D. +1°, 4774** **Mag. 8.9** **R. A. 23h 41.6m** **Decl. +1° 37′** **Pos. Angle.**

c +1°, 4766 8.5 23 37.7 1 17 251°.7

d +1°, 4793 8.5 23 45.7 1 31 95°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1907 July 4	21 45	3	58.5	301.727*	285.284*	+0.042	−0.020	587.033
5	21 11	3–4	60.5	.719*	.287*	.041	.019	.028
9	21 21	3–4	63.5	.752*	.314*	.040	.019	.087
12	20 43	3–4	61	.734*	.305*	.039	.018	.060
1907 Nov. 25	0 40	3	31	301.737	285.310	+0.008	−0.004	587.051
27	2 48	3–4	30.5	.753	.307	.008	.004	.064
28	2 7	3–4	41	.733	.303	.007	.004	.039
30	1 23	3–4	30.5	.737	.314	.007	.004	.054
Dec. 2	1 32	3–4	22.5	.752	.328	.007	.003	.084
3	1 11	1–2	24.5	.720	.294	.007	.003	.018
5	0 20	3	23.5	.744	.296	.006	.003	.043
8	0 42	1–2	34.5	.734	.302	.006	.003	.039
1908 July 15	21 39	3–4	60	301.824	285.221	−0.045	+0.017	587.017
Aug. 14	21 36	3–4	64	.837	.264	.051	.024	.074
18	21 30	3–4	63	.795	.271	.052	.025	.039
20	21 19	3–4	56	.820	.270	.052	.025	.063
23	22 13	3–4	61	.802	.243	.053	.025	.017
				Assumed Annual Proper Motion and Mean Sum:		+0.076	−0.039	587.048

Lalande 46650 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	16.443	+0.000	16.505	+1.0 x	+1.79 y	−0.50 z	= +0.055	+0.007
	.432	+ .001	.493	1.0	1.78	0.49	+ .043	− .005
	.438	− .001	.496	1.0	1.75	0.48	+ .046	− .002
	.429	− .000	.486	1.0	1.71	0.47	+ .036	− .011
S.	16.427	−0.000	16.439	+1.0 x	−1.78 y	−0.10 z	= −0.011	−0.002
	.446	− .000	.458	1.0	1.78	0.10	+ .008	+ .017
	.430	+ .000	.441	1.0	1.78	0.09	− .009	− .000
	.423	− .000	.434	1.0	1.78	0.09	− .016	− .007
	.424	− .001	.433	1.0	1.79	0.08	− .017	− .008
	.426	+ .001	.437	1.0	1.79	0.08	− .013	− .004
	.448	+ .000	.457	1.0	1.79	0.07	+ .007	+ .016
	.432	+ .000	.441	1.0	1.80	0.07	− .009	− .000
S.	16.603	+0.001	16.542	+1.0 x	+1.67 y	+0.54 z	= +0.092	+0.045
	.573	− .001	.497	1.0	1.06	0.62	+ .047	+ .010
	.524	+ .000	.447	1.0	0.97	0.63	− .003	− .039
	.550	− .000	.473	1.0	0.91	0.63	+ .023	− .012
	.559	+ .001	.482	1.0	0.81	0.64	+ .032	− .001

Assumed Mean Difference: 16.450

Normals:				R	*Solution:*	R	R	
+17.00 x	− 1.84 y	+0.44 z	=	+0.311	x =	+0.0200	±0.0030	Wt. 16.8
− 1.84	+44.17	+1.07	=	+0.671	y =	+0.0160	±0.0019	43.5
+ 0.44	+ 1.07	+2.88	=	+0.028	z =	+0.0007	±0.0068	2.8

$[nn] = 0.02163$ $[vv] = 0.00467$ Prob. Error 1 Eq. = ±0″.157

$\pi = +0''.203$ ±0″.024

The previous value found by ELKIN from the pair *a b* was

E. $\pi = +0''.200$ ±0″.084 Wt. 21.2 Prob. Error 1 Obs. ±0″.389 11 Obs.

and hence the combined values from the three series are: —

Method α: $\pi = +0''.188$ ±0″.016
" β: $\pi = +0.186$ ±0.015
" γ: $\pi = +0.182$ ±0.016

and the final result is

Lalande 46650: $\pi = +0''.185 \pm 0''.016$

§ 17. REVISION FOR TWO STARS. CHASE.

There are two other stars of our earlier list the results for which require revision without evidence furnished by further observations. These are 54 Piscium and Lalande 43492.

In the case of the first star for which there were four series we desire to substitute for the weighted mean given on p. 194 that found by the present adopted plan of combination. The four results are: —

CHASE.	Series	I_1 :	$\pi = +0''.241$	$\pm 0''.026$	Wt. 36.1	Prob. Error 1 Obs.	$\pm 0''.152$	12 Obs.
"	"	I_2 :	$\pi = +0''.081$	$\pm 0''.017$	42.3		$\pm 0''.110$	12
"	"	II :	$\pi = +0''.183$	$\pm 0''.035$	59.5		$\pm 0''.275$	16
"	"	III :	$\pi = +0''.054$	$\pm 0''.023$	51.4		$\pm 0''.167$	16

These give:—

Method α:	$\pi = +0''.140$	$\pm 0''.018$
" β:	$\pi = +0''.136$	$\pm 0''.013$
" γ:	$\pi = +0''.116$	$\pm 0''.011$

and the mean of these is our final value:—

54 Piscium: $\pi = +0''.131 \pm 0''.014$

In the published data of Lalande 43492 I subsequently discovered that I had made a mistake in the observation of 1895, Nov. 11, copying from the observation sheets $34.^R016$ for $34.^R116$. This error in a series involving only a single comparison star produced a very marked effect on the result for parallax and the probable error, as will be seen from the corrected solution given below. The corresponding "Corrected Distance" should read $34.^R071$ instead of $33.^R971$ and the n term in the equation of condition $+0.^R027$ for $-0.^R073$. With these corrections we have the following:—

Normals:	$+11.00\,x$	$+0.57\,y$	$+4.06\,z$	$= +0.^R124$	*Solution:*	$x = +0.^R0059$	$\pm 0.^R0031$ Wt. 8.92
	$+0.57$	$+6.58$	$+1.17$	$= -0.004$		$y = -0.0037$	± 0.0036 6.41
	$+4.06$	$+1.17$	$+7.92$	$= +0.139$		$z = +0.0150$	± 0.0037 6.28

$[nn] = 0.00431$ $[vv] = 0.00149$ Prob. Error 1 Eq. $= \pm 0''.116$

Lalande 43492: $\pi = -0''.047 \pm 0''.046$

The revised solution gives the following residuals:—

R	R	R	R
+0.005	−0.004	+0.006	+0.002
+ .017	+ .015	+ .008	− .003
− .015	− .024		− .004

This corrected result naturally affects the assumed average probable error for series with only one comparison star and the averages in the several tables before published, but we hereafter replace the two most important of these, Tables I and II, by a new one in which the stars of the present list are included.

§ 18. THIRTEEN ADDITIONAL STARS. SMITH.

These stars were taken up by me in 1908, while awaiting the completion of the several other series under observation by CHASE, and hence they all have to be treated as falling into two divisions, before and after the break in January 1909. For the four stars which were being observed at this epoch an attempt has been made to derive the proper motion correc-

tions from the available meridian catalogues and the Heliometer measures. The material used is as follows: —

	Catalogue.	*Epochs.*
β Cassiopeiae and Star *a*:	Bonn Vol. VI.	1862.0 and 1862.0
	A. G. C. Fund. and Helsingfors	1871.9 " 1871.9
" " " " *b*:	Argel. N. Zones	1842.0 " 1841.7
	A. G. C. Fund. and Helsingfors	1872.9 " 1872.9
ϵ Cephei and Star *a*:	Argel. N. Zones	1841.8 and 1841.8
	A. G. C. Helsingfors	1873.7 " 1870.8
" " " " *b*:	Argel. N. Zones	1842.7 " 1842.7
	A. G. C. Helsingfors	1873.7 " 1873.8
B. D. +58°, 2605 and Star *a*:	A. G. C. Helsingfors	1872.8 and 1873.0
" " " " *b*:	A. G. C. Helsingfors	1872.8 " 1873.4
B. D. +62°, 2244 and Star *a*:	A. G. C. Helsingfors	1877.0 and 1877.9
" " " " *b*:	A. G. C. Helsingfors	1877.0 " 1878.2

Using the proper motions found from these places it is possible to deduce two separate values of the parallax from the two periods. This is done in *Solution A*; determining only one parallax value gives *Solution B*, while eliminating the proper motion, as usual, is carried out in *Solution C*. The remaining stars having only one epoch in 1908 are treated in the usual manner, only assuming, naturally, two values for x.

β Cassiopeiae	B. D. +58°, 3	Mag. 2.2	R. A. 0^h 1.5^m	Decl. +58° 21′	Pos. Angle.
a	+57°, 2848	8.2	23 55.9	57 59	243°.8
b	+58°, 22	8.0	0 8.1	58 38	71°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 June 26	20 41	2–3	58	234.888	257.302	+0.017	−0.018	492.089
28	20 47	2–3	56.5	.893	.217	.016	.017	.109
30	19 45	2–3	66.5	.889	.225	.016	.017	.113
July 3	19 20	1–2	71	.889	.222	.016	.017	.110
4	19 24	2–3	73	.894	.212	.016	.017	.105
5	18 46	3–4	74.5	.889	.217	.016	.017	.105
1908 Dec. 27	6 18	3	35	234.907	257.198	+0.000	−0.000	492.105
31	6 20	2–3	26	.886	.176	.000	.000	.062
1909 Jan. 1	5 56	2	19.5	.874	.188	.000	.000	.062
1909 Jan. 20	6 8	1–2	26	234.872	257.189	−0.002	+0.002	492.061
22	4 57	1–2	37	.886	.189	.002	.002	.075
23	6 8	1–2	31.5	.881	.198	.002	.002	.079
25	5 33	3–4	34	.874	.192	.002	.002	.066
26	5 7	3	29.5	.844	.167	.002	.002	.011
27	5 22	2	32	.880	.189	.002	.002	.069
Feb. 18	6 15	2–3	27	.902	.200	.004	.004	.102
1909 June 26	19 14	3–4	70	234.896	257.154	−0.015	+0.016	492.051
28	18 41	3	72	.908	.174	.016	.017	.083
29	19 34	2	61	.889	.146	.016	.017	.036
30	19 9	2	67.5	.918	.176	.016	.017	.095
July 12	18 7	2	70	.907	.168	.017	.018	.076
13	18 9	2	75	.910	.179	.017	.018	.090
Assumed Annual Proper Motion and Mean Sum:						+0.032	−0.034	492.080

β Cassiopeiae — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Solution A. R	Residuals. Solution B. R	Solution C. R
S.	22.314	−0.000	22.279	$+1.0\,x_1 - 1.91\,y_1 - 0.52\,z =$	−0.023	−0.012	−0.009	−0.013
	.324	− .001	.290	1.0 1.93 0.51	− .012	− .001	+ .002	− .001
	.336	− .002	.301	1.0 1.94 0.51	− .001	+ .010	+ .013	+ .010
	.333	− .001	.299	1.0 1.96 0.50	− .003	+ .008	+ .011	+ .008
	.318	− .001	.284	1.0 1.96 0.49	− .018	− .007	− .004	− .007
	.328	− .001	.294	1.0 1.96 0.49	− .008	+ .003	+ .006	+ .003
S.	22.291	−0.001	22.290	$+1.0\,x_1 + 1.87\,y_1 - 0.01\,z =$	−0.012	−0.009	−0.015	−0.008
	.290	+ .001	.291	1.0 1.90 0.00	− .011	− .008	− .014	− .008
	.314	+ .001	.315	1.0 1.90 +0.00	+ .013	+ .016	+ .010	+ .016
S.	22.317	+0.001	22.322	$+1.0\,x_2 + 1.89\,y_2 + 0.05\,z =$	+0.020	+0.004	+0.007	+0.004
	.303	+ .000	.307	1.0 1.87 0.06	+ .005	− .011	− .008	− .011
	.317	+ .000	.321	1.0 1.87 0.06	+ .019	+ .003	+ .006	+ .003
	.318	+ .001	.323	1.0 1.85 0.07	+ .021	+ .005	+ .008	+ .006
	.323	+ .003	.330	1.0 1.84 0.07	+ .028	+ .012	+ .015	+ .013
	.309	+ .000	.313	1.0 1.83 0.07	+ .011	− .004	− .002	− .004
	.298	− .001	.305	1.0 1.50 0.13	+ .003	− .010	− .008	− .011
S.	22.258	+0.001	22.290	$+1.0\,x_2 - 1.91\,y_2 + 0.48\,z =$	−0.012	−0.005	−0.008	−0.006
	.266	− .000	.299	1.0 1.93 0.49	− .003	+ .004	+ .001	+ .003
	.257	+ .002	.292	1.0 1.93 0.49	− .010	− .003	− .006	− .004
	.258	− .001	.290	1.0 1.94 0.49	− .012	− .005	− .008	− .006
	.261	+ .000	.296	1.0 1.99 0.53	− .006	+ .002	− .002	+ .001
	.269	− .000	.304	1.0 1.99 0.53	+ .002	+ .010	+ .006	+ .009

Assumed Mean Difference: 22.302

Normals:

				R	
$+9.00\,x_1$	$+0.00\,x_2$	$-5.99\,y_1$	$+0.00\,y_2$	$-3.03\,z =$	-0.075
$+0.00$	$+13.00$	$+0.00$	$+0.96$	$+3.52$	$=+0.066$
-5.99	$+0.00$	$+33.37$	$+0.00$	$+5.84$	$=+0.108$
$+0.00$	$+0.96$	$+0.00$	$+45.75$	-4.98	$=+0.277$
-3.03	$+3.52$	$+5.84$	-4.98	$+3.05$	$=+0.019$

$[nn] = 0.00408$

Solution A

	R		R	
$x_1 =$	−0.0070	$+0.250\,z$	±0.0021	Wt. 7.9
$x_2 =$	+0.0046	$-0.279\,z$	±0.0017	13.0
$y_1 =$	+0.0020	$-0.130\,z$	±0.0011	29.4
$y_2 =$	+0.0059	$+0.115\,z$	±0.0009	45.7

$[vv] = 0.00139$ Prob. Error 1 Eq. = ±″0.076

$\pi = +″0.050 \pm″0.009$

Solution B

	R		R	
$x_1 =$	−0.0054	$+0.349\,z$	±0.0022	Wt. 8.5
$x_2 =$	+0.0048	$-0.272\,z$	±0.0018	13.0
$y =$	+0.0044	$+0.019\,z$	±0.0008	75.1

$[vv] = 0.00168$ Prob. Error 1 Eq. = ±″0.083

$\pi = +″0.056 \pm″0.010$

Solution C

	R	R	
$x_1 =$	−0.0110	±0.0030	Wt. 4.3
$x_2 =$	+0.0091	±0.0024	6.9
$y =$	+0.0040	±0.0007	73.3
$z =$	−0.0159	±0.0058	1.1

$[vv] = 0.00143$ Prob. Error 1 Eq. = ±″0.076

$\pi = +″0.051 \pm″0.009$

Obviously nothing is gained by *Solutions A* and *B*, and hence *Solution C* may be adopted. The parallax value seems worthy of confidence, and including the adopted systematic error we have the final result:—

β Cassiopeiae: $\pi = +″0.051 \pm″0.015$

Lalande 2682	B. D. +20°, 226	Mag. 7.8	R. A. 1h 21.1m	Decl. +20° 59′	Pos. Angle.
a	+21°, 182	7.3	1 14.8	21 20	283°.0
b	+20°, 251	8.4	1 27.9	20 57	91°.0

Date.			Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908	Aug.	7	21	20	3–4	65	447.626	450.933	+0.023	−0.011	898.571
		10	21	57	3	67	.602	.949	.023	.011	.563
		11	21	58	3–4	62	.575	.944	.023	.011	.531
		15	22	4	2–3	64.5	.570	.929	.022	.011	.510
1909	Jan.	27	4	33	2	34	447.512	450.826	−0.004	+0.002	898.336
		28	4	54	3–4	25	.529	.862	.005	.002	.388
	Feb.	17	5	41	3–4	24	.550	.842	.008	.004	.388
		22	5	29	2	38	.534	.860	.008	.004	.390
		25	5	17	3–4	24	.534	.837	.009	.004	.366
		26	5	16	2	28.5	.524	.839	.009	.004	.358
		27	5	19	2–3	36.5	.503	.836	.009	.004	.334
		28	5	0	2–3	31.5	.530	.846	.009	.004	.371
1909	July	3	21	27	3–4	52	447.570	450.868	−0.029	+0.014	898.423
		4	21	47	2–3	55	.574	.852	.030	.014	.410
		7	21	35	2–3	55	.576	.867	.030	.014	.427
		8	21	39	2–3	54	.562	.844	.030	.015	.391
		13	21	43	2	68	.580	.877	.031	.015	.441
		14	21	33	2	66	.580	.864	.031	.015	.428
		17	21	47	2	63	.588	.854	.031	.015	.426
		18	22	56	2	58	.592	.858	.031	.015	.434
1910	Feb.	4	5	11	2	26	447.578	450.824	−0.064	+0.031	898.369
		5	4	43	3	22	.586	.790	.064	.031	.343
		6	4	33	3–4	3	.588	.830	.064	.031	.385
		7	4	29	2	8	.582	.822	.064	.031	.371
							Assumed Annual Proper Motion and Mean Sum:		+0.058	−0.028	898.415

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	3.307	−0.001	3.272	$+1.0\,x_1$	$-1.59\,y$	$-0.40\,z$	$= -0.053$	−0.039
	.347	− .001	.312	1.0	1.56	0.39	− .013	+ .001
	.369	− .000	.335	1.0	1.55	0.39	+ .010	+ .024
	.359	− .000	.326	1.0	1.50	0.38	+ .001	+ .015
S.	3.314	+0.000	3.320	$+1.0\,x_2$	$+1.61\,y$	$+0.07\,z$	$= -0.005$	−0.007
	.333	+ .000	.340	1.0	1.60	0.08	+ .015	+ .013
	.292	+ .000	.304	1.0	1.34	0.13	− .021	− .023
	.326	+ .000	.338	1.0	1.23	0.14	+ .013	+ .011
	.303	+ .000	.316	1.0	1.15	0.15	− .009	− .011
	.315	+ .000	.328	1.0	1.13	0.16	+ .003	+ .001
	.333	+ .000	.346	1.0	1.11	0.16	+ .021	+ .019
	.316	+ .000	.329	1.0	1.08	0.16	+ .004	+ .002
S.	3.298	−0.000	3.341	$+1.0\,x_2$	$-1.74\,y$	$+0.50\,z$	$= +0.016$	+0.013
	.278	+ .000	.322	1.0	1.74	0.51	− .003	− .006
	.291	− .000	.335	1.0	1.74	0.51	+ .010	+ .007
	.282	+ .000	.327	1.0	1.74	0.52	+ .002	− .001
	.297	− .000	.343	1.0	1.75	0.53	+ .018	+ .015
	.284	− .000	.330	1.0	1.75	0.53	+ .005	+ .002
	.266	− .000	.312	1.0	1.76	0.54	− .013	− .016
	.266	− .000	.312	1.0	1.76	0.54	− .013	− .016
S.	3.246	+0.000	3.341	$+1.0\,x_2$	$+1.53\,y$	$+1.10\,z$	$= +0.016$	+0.013
	.204	+ .000	.299	1.0	1.52	1.10	− .026	− .029
	.242	+ .000	.337	1.0	1.51	1.10	+ .012	+ .009
	.240	+ .000	.335	1.0	1.50	1.10	+ .010	+ .007
	Assumed Mean Difference:		3.325					

Lalande 2682 — *continued.*

					R				
Normals:	$+4.00\,x_1$	$+\ 0.00\,x_2$	$-\ 6.20\,y$	$-1.56\,z$	$= -0.055$	*Solution:*	R	R	
	$+0.00$	$+20.00$	$+\ 2.33$	$+9.63$	$= +0.053$	x_1	$= -0.0135$	± 0.0070	Wt. 2.7
	-6.20	$+\ 2.33$	$+56.69$	$+3.05$	$= +0.092$	x_2	$= +0.0024$	± 0.0043	7.0
	-1.56	$+\ 9.63$	$+\ 3.05$	$+7.78$	$= +0.049$	y	$= +0.0000$	± 0.0017	46.7
						z	$= +0.0006$	± 0.0073	2.5

$[nn] = 0.00676$ $[vv] = 0.00585$ Prob. Error 1 Eq. $= \pm 0''.146$

$\pi = +0''.000 \pm 0''.022$

With the adopted systematic error the final result is:—

Lalande 2682: $\pi = +0''.000 \pm 0''.020$

Lalande 3022	**B. D. +27°, 262**		**Mag. 7.8**	**R. A. 1h 31.4m**	**Decl. +27° 22′**		**Pos. Angle.**
a	+27°, 248		7.3	1 27.5	27 32		280°.4
b	+27°, 277		7.5	1 36.7	27 44		73°.0
Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Aug. 7	21 53	3–4	65	248.735	346.501	+0.011	−0.020	595.227
10	22 22	3	66.5	.733	.468	.011	.020	.192
11	21 33	3–4	63	.716	.479	.011	.020	.186
15	22 25	2–3	64.5	.711	.492	.011	.019	.195
1909 Jan. 27	4 56	2	32.5	248.689	346.414	−0.002	+0.004	595.105
28	5 28	3–4	25	.706	.392	.002	.004	.100
Feb. 17	6 15	3–4	24	.724	.454	.004	.006	.180
18	5 53	2–3	28	.730	.452	.004	.006	.184
22	6 10	2	37	.694	.426	.004	.007	.123
25	6 10	3–4	23	.710	.424	.004	.008	.138
26	6 11	2	28.5	.690	.414	.004	.008	.108
27	6 5	2–3	36	.693	.410	.004	.008	.107
1909 July 3	21 4	3–4	54	248.741	346.440	−0.014	+0.025	595.192
4	21 19	3	56	.742	.412	.014	.025	.165
7	21 13	2–3	56	.740	.434	.014	.025	.185
8	21 16	2–3	55	.724	.418	.015	.026	.153
13	21 19	2	69	.734	.412	.015	.026	.157
14	23 7	2	62	.742	.427	.015	.026	.180
17	20 57	2	63	.748	.430	.015	.027	.190
18	21 19	2	61	.736	.418	.015	.027	.166
1910 Feb. 4	5 42	2	26	248.731	346.372	−0.031	+0.055	595.127
5	5 6	3	22	.743	.385	.031	.055	.152
6	5 7	3–4	3	.737	.378	.031	.055	.139
7	4 51	2	8	.714	.364	.031	.055	.102
					Assumed Annual Proper Motion and Mean Sum:	+0.028	−0.050	595.156

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	97.766	−0.012	97.723	$+1.0\,x_1$	$-1.75\,y$	$-0.40\,z$	$= -0.005$	−0.000
	.735	− .006	.698	1.0	1.72	0.39	− .030	− .025
	.763	− .005	.727	1.0	1.71	0.39	− .001	+ .004
	.781	− .006	.745	1.0	1.66	0.38	+ .017	+ .022
S.	97.725	+0.008	97.739	$+1.0\,x_2$	$+1.75\,y$	$+0.07\,z$	$= +0.011$	+0.006
	.686	+ .009	.701	1.0	1.75	0.08	− .027	− .032
	.730	− .004	.736	1.0	1.52	0.13	+ .008	+ .004
	.722	− .003	.729	1.0	1.51	0.13	+ .001	− .003
	.732	+ .005	.748	1.0	1.43	0.14	+ .020	+ .016
	.714	+ .003	.729	1.0	1.37	0.15	+ .001	− .003
	.724	+ .008	.744	1.0	1.35	0.16	+ .016	+ .012
	.717	+ .008	.737	1.0	1.33	0.16	+ .009	+ .005

Lalande 3022 — *continued.*

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	97.699	−0.006	97.732	$+1.0\,x_2$	$-1.79\,y$	$+0.50\,z$ =	+0.004	+0.008
	.670	− .001	.708	1.0	1.80	0.51	− .020	− .015
	.694	− .005	.728	1.0	1.81	0.51	+ .000	+ .004
	.694	+ .000	.735	1.0	1.82	0.52	+ .007	+ .012
	.678	− .000	.719	1.0	1.85	0.53	− .009	− .004
	.685	− .002	.724	1.0	1.86	0.53	− .004	+ .001
	.682	− .006	.718	1.0	1.87	0.54	− .010	− .005
	.682	− .002	.722	1.0	1.88	0.54	− .006	− .001
S.	97.641	+0.005	97.732	$+1.0\,x_2$	$+1.70\,y$	$+1.10\,z$ =	+0.004	−0.003
	.642	+ .001	.729	1.0	1.69	1.10	+ .001	− .006
	.641	+ .003	.730	1.0	1.68	1.10	+ .002	− .005
	.650	+ .009	.745	1.0	1.68	1.10	+ .017	+ .010

Assumed Mean Difference: 97.728

				R		R	R	
Normals:	$+4.00\,x_1$	$+0.00\,x_2$	$-6.84\,y$	$-1.56\,z$ = −0.019	*Solution:*	x_1 = +0.0010	±0.0047	Wt. 2.7
	+0.00	+20.00	+ 4.08	+9.60 = +0.025		x_2 = −0.0003	±0.0033	7.0
	−6.84	+ 4.08	+68.25	+3.91 = +0.196		y = +0.0029	±0.0012	55.5
	−1.56	+ 9.60	+ 3.91	+7.77 = +0.022		z = +0.0020	±0.0055	2.5

$[nn] = 0.00388$ $[vv] = 0.00332$ Prob. Error 1 Eq. = $\pm 0''.110$

$\pi = +0''.037 \pm 0''.015$

With the adopted systematic error the final result is

Lalande 3022: $\pi = +0''.037 \pm 0''.017$

γ_2 Ceti	B. D. +2°, 422	Mag. 3.5	R. A. $2^h\ 35.8^m$	Decl. +2° 38′	Pos. Angle.
a	+1°, 455	8.2	2 29.6	1 48	241°.5
b	+3°, 387	8.0	2 41.4	3 29	58°.8

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908	Aug.	29	0 16	2–3	54	495.294	466.179	−0.011	+0.009	961.471
		31	0 6	2	59.5	.304	.240	.010	.009	.543
	Sept.	7	0 14	3–4	55	.284	.179	.010	.009	.462
		8	1 29	3–4	53	.274	.169	.010	.008	.441
1909	Feb.	22	5 51	2	37.5	495.234	466.166	+0.004	−0.004	961.400
		25	5 47	3–4	24	.261	.170	.005	.004	.432
		26	5 40	2	28.5	.221	.141	.005	.004	.363
		27	5 43	2–3	36.5	.285	.176	.005	.004	.462
		28	5 25	2–3	31.5	.243	.158	.005	.004	.402
	Mar.	5	5 51	3–4	23	.233	.160	.006	.005	.394
		7	5 47	3	37.5	.249	.161	.006	.005	.411
		8	5 48	2	33	.247	.162	.006	.005	.410
1909	July	24	23 58	3	58.5	495.278	466.190	+0.017	−0.015	961.470
		25	0 5	2	59	.246	.140	.017	.015	388
		26	23 58	1–2	64	.266	.171	.018	.015	.440

γ_2 Ceti — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1909 July	27	23 48	1–2	64.5	495.274	466.172	+0.018	−0.015	961.449
	28	23 53	1–2	64.5	.271	.173	.018	.015	.447
	29	23 52	1–2	74	.266	.170	.018	.015	.439
	30	23 54	2	69.5	.284	.192	.018	.016	.478
	31	0 3	2	64	.270	.172	.018	.016	.444
1910 Feb.	5	5 32	3	21	495.208	466.171	+0.034	−0.030	961.383
	7	5 50	2	8	.222	.193	.034	.030	.419
	8	4 36	2	28	.222	.199	.034	.030	.425
	9	4 57	2–3	26.5	.219	.186	.034	.030	.409
							−0.031	+0.027	961.432

Assumed Annual Proper Motion and Mean Sum: −0.031 +0.027 961.432

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	29.115	−0.001	29.094	$+1.0\,x$	$+1.69\,y$	$-0.34\,z$	$= -0.008$	+0.016
	.064	− .003	.042	1.0	1.65	0.33	− .060	− .036
	.105	− .001	.085	1.0	1.52	0.32	− .017	+ .009
	.105	− .000	.087	1.0	1.49	0.31	− .015	+ .011
S.	29.068	+0.000	29.076	$+1.0\,x_2$	$-1.65\,y$	$+0.14\,z$	$= -0.026$	−0.018
	.091	+ .000	.100	1.0	1.58	0.15	− .002	+ .006
	.080	+ .002	.091	1.0	1.56	0.16	− .011	− .004
	.109	− .001	.117	1.0	1.54	0.16	+ .015	+ .022
	.085	+ .001	.095	1.0	1.52	0.16	− .007	− .000
	.073	+ .001	.085	1.0	1.47	0.18	− .017	− .011
	.088	+ .001	.100	1.0	1.42	0.18	− .002	+ .004
	.085	+ .001	.097	1.0	1.40	0.18	− .005	+ .001
S.	29.088	−0.001	29.119	$+1.0\,x_2$	$+1.98\,y$	$+0.56\,z$	$= +0.017$	−0.010
	.106	+ .001	.139	1.0	1.98	0.56	+ .037	+ .010
	.095	− .000	.128	1.0	1.99	0.57	+ .026	− .002
	.102	− .001	.134	1.0	1.99	0.57	+ .032	+ .004
	.098	− .000	.131	1.0	1.99	0.57	+ .029	+ .001
	.096	− .000	.129	1.0	1.99	0.57	+ .027	− .001
	.092	− .001	.125	1.0	1.99	0.58	+ .023	− .005
	.098	− .000	.132	1.0	1.98	0.58	+ .030	+ .002
S.	29.037	+0.001	29.102	$+1.0\,x_2$	$-1.88\,y$	$+1.10\,z$	$= -0.000$	+0.007
	.029	+ .000	.093	1.0	1.87	1.10	− .009	− .002
	.023	+ .000	.087	1.0	1.86	1.11	− .015	− .008
	.033	+ .001	.098	1.0	1.86	1.11	− .004	+ .003

Assumed Mean Difference: 29.102

Normals:

				R
$+4.00\,x_1$	$+0.00\,x_2$	$+6.35\,y$	$-1.30\,z$	$= -0.100$
$+0.00$	$+20.00$	-3.72	$+10.29$	$= +0.138$
$+6.35$	-3.72	$+74.09$	-3.25	$= +0.417$
-1.30	$+10.29$	-3.25	$+8.09$	$= +0.119$

Solution:

	R	R	
x_1	$= -0.0387$	± 0.0050	Wt. 2.9
x_2	$= +0.0067$	± 0.0034	6.1
y	$= +0.0094$	± 0.0011	63.1
z	$= +0.0038$	± 0.0055	2.4

$[nn] = 0.01245$ $[vv] = 0.00313$ Prob. Error 1 Eq. $= \pm 0''.107$

$\pi = +0''.119 \pm 0''.014$

Using the adopted systematic error the final result is

γ_2 Ceti : $\pi = +0''.119 \pm 0''.017$

Weisse 2^h, 927	B. D. +5°, 435	Mag. 8.2	R. A. 2^h 52.9^m	Decl. +5° 25′	Pos. Angle.
a	+5°, 420	7.5	2 48.4	5 35	279°.1
b	+5°, 447	7.8	2 58.0	5 33	83°.9

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1908 Aug. 29	23 49	2–3	54	319.334	362.349	+0.013	−0.032	681.664
31	23 38	2	59	.347	.363	.013	.031	.692
Sept. 7	23 54	3–4	56	.355	.381	.012	.030	.718
8	1 3	2–3	55	.368	.362	.012	.029	.713
1909 Feb. 27	6 24	2–3	36	319.323	362.318	−0.006	+0.015	681.650
Mar. 5	6 21	3–4	22	.337	.311	.007	.017	.658
10	6 21	2	29.5	.324	.298	.007	.018	.633
11	6 14	2–3	28.5	.350	.337	.007	.018	.698
12	6 15	2	36.5	.328	.300	.007	.018	.639
14	6 15	1–2	36.5	.356	.336	.008	.019	.703
15	6 35	2	33.5	.323	.300	.008	.019	.634
16	6 30	2	34.5	.328	.311	.009	.019	.649
1909 July 24	23 39	3	58.5	319.383	362.294	-0.022	+0.052	681.707
25	23 42	2	59	.370	.298	.022	.052	.698
26	23 31	1–2	54	.391	.292	.022	.053	.714
27	23 26	1–2	65	.394	.319	.022	.053	.744
28	23 31	1–2	64.5	.362	.282	.022	.053	.675
29	23 27	1–2	74	.380	.296	.022	.053	.707
30	23 28	2	69.5	.390	.304	.023	.054	.725
31	23 36	2	64	.380	.297	.023	.054	.708
1910 Feb. 8	5 41	2	28	319.342	362.222	−0.043	+0.103	681.624
9	5 21	2–3	26.5	.372	.258	.043	.103	.690
10	5 14	2	25.5	.377	.250	.043	.103	.687
12	5 1	2–3	28.5	.368	.230	.044	.104	.658
Assumed Annual Proper Motion and Mean Sum:						+0.039	−0.093	681.682

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	43.015	+0.001	42.971	$+1.0\,x_1 - 1.78\,y - 0.34\,z =$	−0.027	+0.003
	.016	− .001	.971	1.0 1.75 0.33	− .027	+ .003
	.026	− .002	.982	1.0 1.65 0.32	− .016	+ .013
	42.994	− .002	.951	1.0 1.63 0.31	− .047	− .018
S.	42.995	+0.002	43.018	$+1.0\,x_2 + 1.69\,y + 0.16\,z =$	+0.020	+0.010
	.974	+ .002	.000	1.0 1.62 0.18	+ .002	− .008
	.974	+ .003	.002	1.0 1.55 0.19	+ .004	− .005
	.987	− .001	.011	1.0 1.53 0.19	+ .013	+ .004
	.972	+ .003	.000	1.0 1.51 0.19	+ .002	− .007
	.980	− .001	.006	1.0 1.47 0.20	+ .008	− .001
	.977	+ .003	.007	1.0 1.46 0.20	+ .009	+ .000
	.983	+ .002	.013	1.0 1.44 0.21	+ .015	+ .006
S.	42.911	−0.002	42.983	$+1.0\,x_2 - 1.84\,y + 0.56\,z =$	−0.015	−0.007
	.928	− .001	43.001	1.0 1.84 0.56	+ .003	+ .011
	.901	− .002	42.974	1.0 1.85 0.57	− .024	− .016
	.925	− .004	.996	1.0 1.86 0.57	− .002	+ .006
	.920	+ .000	.995	1.0 1.86 0.57	− .003	+ .005
	.916	− .002	.989	1.0 1.86 0.57	− .009	− .001
	.914	− .003	.988	1.0 1.87 0.58	− .010	− .002
	.917	− .002	.992	1.0 1.87 0.58	− .006	+ .002
S.	42.880	+0.004	43.030	$+1.0\,x_2 + 1.85\,y + 1.11\,z =$	+0.032	+0.007
	.886	− .001	.031	1.0 1.85 1.11	+ .033	+ .008
	.873	− .000	.019	1.0 1.84 1.11	+ .021	− .004
	.862	+ .002	.012	1.0 1.83 1.12	+ .014	− .011
Assumed Mean Difference:			42.998			

Weisse 2^h, 927 — *continued.*

Normals:	$+4.00\,x_1$	$+0.00\,x_2$	$-6.81\,y$	$-1.30\,z$	$=$	R -0.117	*Solution:*
	$+0.00$	$+20.00$	$+4.79$	$+10.53$	$=$	$+0.107$	
	-6.81	$+4.79$	$+71.63$	$+4.28$	$=$	$+0.619$	
	-1.30	$+10.53$	$+4.28$	$+8.25$	$=$	$+0.125$	

	R	R	
x_1	$=-0.0126$	± 0.0035	Wt. 2.9
x_2	$=-0.0041$	± 0.0025	5.8
y	$=+0.0069$	± 0.0008	58.8
z	$=+0.0148$	± 0.0039	2.3

$[nn] = 0.00868$ $[vv] = 0.00155$ Prob. Error 1 Eq. $= \pm 0''.076$

$\pi = +0''.088 \pm 0''.010$

Taking account of the adopted systematic error the final result is

Weisse 2^h, 927: $\pi = +0''.088 \pm 0''.015$

Lalande 29917	**B. D. +67°, 935**	**Mag. 8.6**	**R. A. 16^h 16.5^m**	**Decl. +67° 35′**	**Pos. Angle.**
a	+67°, 928	8.7	16 9.0	67 45	281°.4
b	+67°, 941	7.3	16 24.9	67 23	102°.4

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Sept. 8	21 36	3–4	58.5	203.836	238.760	−0.007	+0.016	442.605
9	21 50	3–4	62	.837	.784	.007	.016	.630
13	22 49	3	53.5	.832	.742	.007	.016	.583
14	23 37	3	48.5	.824	.760	.007	.016	.593
1909 Feb. 22	12 9	2	32	203.826	238 733	+0.003	−0.007	442.555
23	11 15	1–2	32.5	.812	.742	.003	.008	.549
24	9 51	2	28	.816	.726	.003	.008	.537
25	11 45	3–4	19	.811	.756	.003	.008	.562
26	10 46	3	24.5	.814	.748	.004	.008	.558
28	12 5	2	21	.782	.728	.004	.008	.506
Mar. 5	11 40	3–4	19	.831	.742	.004	.009	.568
11	11 36	3	26	.824	.736	.005	.010	.555
1909 Aug. 20	21 20	2	60.5	203.780	238.792	+0.015	−0.033	442.554
21	21 58	1–2	62.5	.784	.782	.015	.033	.548
22	21 42	1–2	57	.798	.802	.015	.033	.582
23	21 46	2	66	.777	.781	.015	.033	.540
24	21 31	2	67	.782	.798	.016	.034	.562
27	21 21	2	67	781	.792	.016	.034	.555
28	21 9	2	65	.773	.773	.016	.034	.528
29	22 7	2	67	.781	.779	.016	.034	.542
1910 Feb. 13	11 30	3	18.5	203.812	238.806	+0.027	−0.058	442.587
17	10 4	3	27	.780	.774	.027	.059	.522
18	10 32	3	9	794	.784	.027	.059	.546
19	10 6	3	15.5	.779	.795	.027	.059	.542
Assumed Annual Proper Motion and Mean Sum:						−0.024	+0.052	442.559

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	34.924	−0.004	34.943	$+1.0\,x_1$	$+1.83\,y$	$-0.31\,z$	$=+0.009$	−0.006
	947	− .006	.964	1.0	1.81	0.31	+ .030	+ .015
	.910	− .003	.930	1.0	1.75	0.30	− .004	− .018
	.936	− .003	.956	1.0	1.73	0.30	+ .022	+ .008

Lalande 29917 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	34.907	+0.001	34.898	+1.0 x_2	−1.90 y	+0.14 z =	−0.036	−0.015
	.930	+ .001	.920	1.0	1.89	0.15	− .014	+ .007
	.910	+ .002	.901	1.0	1.88	0.15	− .033	− .012
	.945	− .000	.934	1.0	1.87	0.15	− .000	+ .021
	.934	+ .000	.922	1.0	1.86	0.16	− .012	+ .009
	.946	+ .004	.938	1.0	1.85	0.16	+ .004	+ .025
	.911	− .001	.897	1.0	1.80	0.18	− .037	− .017
	.912	+ .000	.897	1.0	1.72	0.19	− .037	− .018
S.	35.012	+0.000	34.964	+1.0 x_2	+1.99 y	+0.63 z =	+0.030	+0.007
	34.998	+ .001	.951	1.0	1.98	0.64	+ .017	− .006
	35.004	− .002	.954	1.0	1.98	0.64	+ .020	− .003
	.004	+ .002	.958	1.0	1.98	0.64	+ .024	+ .001
	.016	− .000	.966	1.0	1.97	0.65	+ .032	+ .009
	.011	+ .000	.961	1.0	1.96	0.65	+ .027	+ .004
	.000	+ .002	.952	1.0	1.95	0.66	+ .018	− .005
	34.998	+ .001	.949	1.0	1.94	0.66	+ .015	− .008
S.	34.994	−0.002	34.907	+1.0 x_2	−1.92 y	+1.12 z =	−0.027	−0.006
	.994	+ .003	.911	1.0	1.92	1.13	− .023	− .002
	.990	+ .001	.905	1.0	1.92	1.13	− .029	− .008
	35.016	+ .001	.931	1.0	1.92	1.14	− .003	+ .018

Assumed Mean Difference: 34.934

					R		R	R	
Normals:	+4.00 x_1	+ 0.00 x_2	+ 7.12 y	− 1.22 z	= +0.057	*Solution:*	x_1 = −0.0057	±0.0053	Wt. 2.9
	+0.00	+20.00	− 6.70	+10.97	= −0.064		x_2 = +0.0001	±0.0038	5.7
	+7.12	− 6.70	+85.73	− 3.03	= +0.923		y = +0.0113	±0.0011	67.8
	−1.22	+10.97	− 3.03	+ 9.05	= −0.018		z = +0.0008	±0.0057	2.5

$[nn] = 0.01253$ $[vv] = 0.00354$ Prob. Error 1 Eq. = ±0″.114

$\pi = +0''.144 \pm 0''.014$

With the systematic error adopted we find the final value: —

Lalande 29917: $\pi = +0''.144 \pm 0''.017$

Lalande 30271	B. D. +31°, 2873	Mag. 7.2	R. A. 16h 30.9m	Decl. +31° 15′	Pos. Angle.
a	+31°, 2859	7.5	16 25.3	31 16	269°.9
b	+31°, 2886	7.4	16 36.0	31 9	94°.5

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Sept. 8	21	6	3–4	59	335.400	314.486	0.000	0.000	649.886
20	20	54	3	58.5	.403	.484	.000	.000	.887
21	21	13	2–3	54.5	.402	.497	.000	.000	.899
28	20	56	3–4	52	.384	.490	.000	.000	.874
1909 Feb. 22	12	35	2	32	335.372	314.456	0.000	0.000	649.828
23	12	56	1–2	32.5	.363	.452	.000	.000	.815
24	12	52	2	28	.364	.454	.000	.000	.818
25	12	10	3–4	18.5	.376	.472	.000	.000	.848
28	12	30	2	20	.374	.475	.000	.000	.849
Mar. 5	12	5	3–4	18	.410	.474	.000	.000	.884
11	11	58	3	25.5	.376	.436	.000	.000	.812
14	12	30	2	30.5	.362	.458	.000	.000	.820

Lalande 30271 — *continued.*

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance a. R	Distance δ. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1909 Aug. 20	20 51	2	60.5	335.372	314.476	0.000	0.000	649.848
21	21 20	1–2	62.5	.396	.478	.000	.000	.874
22	21 15	1–2	57	.387	.482	.000	.000	.869
23	21 22	2	66.5	.394	.473	.000	.000	.867
24	21 2	2	67	.384	.464	.000	.000	.848
27	20 46	2	67	.398	.472	.000	.000	.870
28	20 50	2	65	.380	.458	.000	.000	.838
29	20 30	2	67	.385	.464	.000	.000	.849
1910 Feb. 13	12 5	3	18.5	335.382	314.458	0.000	0.000	649.840
17	12 28	3	27	.366	.463	.000	.000	.829
18	12 15	3	9	.366	.442	.000	.000	.808
19	12 54	3–4	15.5	.378	.459	.000	.000	.837
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	649.850

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
S.	20.914	−0.001	20.913	$+1.0\,x_1 - 1.95\,y - 0.31\,z = -0.001$	+0.006
	.919	− .001	.918	$1.0 \quad 1.85 \quad 0.28 \quad + .004$	+ .011
	.905	− .002	.903	$1.0 \quad 1.84 \quad 0.28 \quad - .011$	− .004
	.894	− .001	.893	$1.0 \quad 1.72 \quad 0.26 \quad - .021$	− .014
S.	20.916	+0.001	20.917	$+1.0\,x_2 + 1.94\,y + 0.14\,z = +0.003$	+0.002
	.911	+ .001	.912	$1.0 \quad 1.94 \quad 0.15 \quad - .002$	− .003
	.910	+ .001	.911	$1.0 \quad 1.94 \quad 0.15 \quad - .003$	− .004
	.904	+ .000	.904	$1.0 \quad 1.94 \quad 0.15 \quad - .010$	− .011
	.899	+ .000	.899	$1.0 \quad 1.94 \quad 0.16 \quad - .015$	− .016
	.936	− .001	.935	$1.0 \quad 1.92 \quad 0.18 \quad + .021$	+ .020
	.940	+ .001	.941	$1.0 \quad 1.89 \quad 0.19 \quad + .027$	+ .026
	.904	+ .001	.905	$1.0 \quad 1.87 \quad 0.20 \quad - .009$	− .010
S.	20.896	+0.001	20.897	$+1.0\,x_2 - 1.95\,y + 0.63\,z = -0.017$	−0.019
	.918	− .001	.917	$1.0 \quad 1.95 \quad 0.64 \quad + .003$	+ .001
	.905	− .001	.904	$1.0 \quad 1.95 \quad 0.64 \quad - .010$	− .012
	.921	− .001	.920	$1.0 \quad 1.96 \quad 0.64 \quad + .006$	+ .004
	.920	+ .000	.920	$1.0 \quad 1.96 \quad 0.65 \quad + .006$	+ .004
	.926	− .001	.925	$1.0 \quad 1.97 \quad 0.65 \quad + .011$	+ .009
	.922	+ .000	.922	$1.0 \quad 1.97 \quad 0.66 \quad + .008$	+ .006
	.921	+ .000	.921	$1.0 \quad 1.97 \quad 0.66 \quad + .007$	+ .005
S.	20.924	+0.000	20.924	$+1.0\,x_2 + 1.90\,y + 1.12\,z = +0.010$	+0.006
	.903	+ .001	.904	$1.0 \quad 1.93 \quad 1.13 \quad - .010$	− .014
	.924	+ .001	.925	$1.0 \quad 1.93 \quad 1.13 \quad + .011$	+ .007
	.919	+ .000	.919	$1.0 \quad 1.94 \quad 1.14 \quad + .005$	+ .001
Assumed Mean Difference:	20.914				

Normals:

				R
$+4.00\,x_1$	$+ 0.00\,x_2$	$- 7.36\,y$	$- 1.13\,z$	$= -0.029$
$+0.00$	$+20.00$	$+ 7.40$	$+11.01$	$= +0.031$
-7.36	$+ 7.40$	$+88.66$	$+ 3.19$	$= +0.074$
-1.13	$+11.01$	$+ 3.19$	$+ 9.01$	$= +0.039$

Solution:

	R	R	
$x_1 =$	-0.0060	± 0.0048	Wt. 2.9
$x_2 =$	$+0.0003$	± 0.0034	5.6
$y =$	$+0.0002$	± 0.0010	69.4
$z =$	$+0.0032$	± 0.0051	2.5

$[nn] = 0.00323$ $[vv] = 0.00291$ Prob. Error 1 Eq. $= \pm 0''.104$

$\pi = +0''.003 \quad \pm 0''.013$

Including the systematic error the final value is

Lalande 30271 : $\pi = +0''.003 \pm 0''.016$

30 Draconis	B. D. +50°, 2468	Mag. 5.0	R. A. $17^h\ 45.6^m$	Decl. +50° 50′	Pos. Angle.
a	+50°, 2438	8.1	17 33.9	50 45	267°.5
b	+50°, 2502	8.0	17 56.6	50 56	86°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Sept. 8	23 42	3–4	57	524.921	493.921	+0.003	+0.007	1018.852
9	22 16	3–4	61.5	.895	.924	.003	.007	.829
10	23 44	3	60.5	.921	.932	.003	.007	.863
13	23 16	3	53	.908	.912	.003	.007	.830
1909 Mar. 5	12 29	3–4	17	524.872	493.902	−0.002	−0.004	1018.768
11	12 20	3	25	.883	.896	.002	.004	.773
14	12 53	2	30.5	.875	.892	.002	.004	.761
15	13 22	2	24.5	.858	.890	.002	.004	.742
16	12 33	2	28	.832	.871	.002	.005	.696
17	12 55	2–3	25	.862	.876	.002	.005	.731
20	12 50	3–4	27	.855	.880	.002	.005	.728
21	12 40	3–4	25	.866	.892	.002	.005	.751
1909 Sept. 4	22 41	3	55	524.866	493.902	−0.006	−0.015	1018.747
5	23 3	2–3	51	.861	.902	.006	.015	.742
7	22 25	3	58	.882	.924	.006	.015	.785
8	22 48	2	60	.879	.922	.006	.015	.780
17	22 46	3–4	61	.902	.920	.006	.016	.800
18	22 9	3–4	58	.895	.921	.006	.016	.794
19	22 58	3–4	52	.894	.921	.006	.016	.793
29	22 36	2	54	.872	.912	.007	.016	.761
1910 Mar. 4	12 49	2–3	31	524.872	493.910	−0.011	−0.026	1018.745
5	12 45	2–3	35	.860	.904	.011	.026	.727
7	13 1	2	34.5	.888	.924	.011	.026	.775
8	13 8	2–3	30.5	.869	.908	.011	.026	.740
Assumed Annual Proper Motion and Mean Sum:						+0.009	+0.022	1018.771

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	31.000	−0.002	30.994	$+1.0\,x_1$	$-1.94\,y$	$-0.31\,z$ =	+0.016	+0.011
	30.971	− .002	.965	1.0	1.95	0.31	− .013	− .018
	.989	− .003	.982	1.0	1.96	0.31	+ .004	− .001
	.996	− .002	.990	1.0	1.98	0.30	+ .012	+ .007
S.	30.970	+0.000	30.972	$+1.0\,x_2$	$+1.91\,y$	$+0.18\,z$ =	−0.006	−0.006
	.987	− .000	.989	1.0	1.95	0.19	+ .011	+ .010
	.983	+ .000	.985	1.0	1.96	0.20	+ .007	+ .006
	.968	+ .001	.971	1.0	1.97	0.20	− .007	− .008
	.961	+ .002	.966	1.0	1.97	0.21	− .012	− .013
	.986	+ .001	.990	1.0	1.97	0.21	+ .012	+ .011
	.975	+ .001	.979	1.0	1.98	0.22	+ .001	+ .000
	.974	+ .001	.978	1.0	1.98	0.22	+ .000	− .001
S.	30.964	+0.001	30.974	$+1.0\,x_2$	$-1.91\,y$	$+0.68\,z$ =	−0.004	−0.001
	.959	+ .001	.969	1.0	1.92	0.68	− .009	− .006
	.958	− .000	.967	1.0	1.94	0.68	− .011	− .008
	.957	− .000	.966	1.0	1.94	0.69	− .012	− .009
	.982	− .001	.991	1.0	2.00	0.71	+ .013	+ .016
	.974	− .001	.983	1.0	2.00	0.71	+ .005	+ .008
	.973	− .001	.982	1.0	2.00	0.72	+ .004	+ .007
	.960	+ .000	.969	1.0	1.97	0.74	− .009	− .006
S.	30.962	+0.001	30.978	$+1.0\,x_2$	$+1.90\,y$	$+1.17\,z$ =	+0.000	+0.001
	.956	+ .001	.972	1.0	1.91	1.18	− .006	− .005
	.964	− .000	.979	1.0	1.93	1.18	+ .001	+ .002
	.961	+ .001	.977	1.0	1.93	1.18	− .001	+ .000
Assumed Mean Difference:			30.978					

30 Draconis — *continued.*

Normals:	$+4.00\,x_1$	$+\ 0.00\,x_2$	$-\ 7.83\,y$	$-\ 1.23\,z$	$=$	R $+0.019$	*Solution:*	R $x_1 = +0.0055$	R ± 0.0037	Wt. 2.7
	$+0.00$	$+20.00$	$+\ 7.68$	$+11.95$	$=$	-0.023		$x_2 = -0.0002$	± 0.0028	4.9
	-7.83	$+\ 7.68$	$+91.55$	$+\ 3.61$	$=$	$+0.006$		$y = +0.0006$	± 0.0007	68.6
	-1.23	$+11.95$	$+\ 3.61$	$+10.19$	$=$	-0.027		$z = -0.0020$	± 0.0038	2.5

$[nn] = 0.00182$ $[vv] = 0.00164$ Prob. Error 1 Eq. $= \pm 0''.078$

$\pi = +0''.008 \pm 0''.009$

With the adopted systematic error the final value is

30 Draconis: $\pi = +0''.008 \pm 0''.015$

Lalande 33439	**B. D. +38°, 3095**	**Mag. 6.7**	**R. A. $18^h\ 4.9^m$**	**Decl. +38° 28′**	**Pos. Angle.**
a	+38°, 3070	8.0	17 58.6	38 5	252°.7
b	+38°, 3128	8.5	18 11.3	38 58	67°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 Sept. 15	22 30	3–4	49	358.122	387.462	−0.011	+0.003	745.576
28	22 26	3–4	52.5	.135	.436	.010	.003	.564
29	22 17	3	49.5	.096	.410	.010	.003	.499
30	22 51	2–3	46.5	.136	.431	.010	.003	.560
1909 Mar. 17	13 35	2–3	24	358.056	387.402	+0.008	−0.002	745.464
20	13 20	3–4	26.5	.084	.422	.009	.002	.513
22	13 24	3	22.5	.094	.404	.009	.002	.505
23	13 36	3–4	30.5	.103	.418	.009	.002	.528
26	12 59	3	27	.092	.428	.009	.003	.526
29	13 25	2	33	.105	.439	.010	.003	.551
30	13 12	2	36.5	.118	.444	.010	.003	.569
Apr. 1	13 7	3–4	37.5	.088	.426	.010	.003	.521
1909 Sept. 17	23 12	2	60	358.072	387.446	+0.028	−0.008	745.538
18	22 37	2	58	.077	.437	.028	.008	.534
19	22 24	3–4	53	.080	.448	.028	.008	.548
20	21 30	3–4	54.5	.072	.435	.028	.008	.527
21	22 27	2	58.5	.045	.420	.028	.008	.485
22	22 42	2	66.5	.050	.417	.028	.008	.487
29	22 12	2	54	.054	.416	.029	.008	.491
30	22 51	2	51	.072	.438	.029	.008	.531
1910 Mar. 18	13 48	2–3	27.5	358.052	387.432	+0.047	−0.013	745.518
20	13 8	2–3	31.5	.044	.427	.048	.013	.506
21	13 47	2–3	39.5	.064	.451	.048	.013	.550
22	13 24	2	36	.052	.427	.048	.013	.514
				Assumed Annual Proper Motion and Mean Sum:		−0.039	+0.011	745.525

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	29.340	−0.002	29.352	$+1.0\,x_1 + 1.76\,y - 0.29\,z = +0.028$		+0.027
	.301	− .002	.312	1.0 1.91 0.26	− .012	− .013
	.314	+ .001	.328	1.0 1.92 0.26	+ .004	+ .003
	.295	− .001	.307	1.0 1.92 0.25	− .017	− .018
S.	29.346	+0.002	29.338	$+1.0\,x_2 - 1.82\,y + 0.21\,z = +0.014$		+0.019
	.338	+ .000	.327	1.0 1.87 0.22	+ .003	+ .008
	.310	+ .001	.300	1.0 1.88 0.22	− .024	− .019
	.315	− .000	.304	1.0 1.89 0.22	− .020	− .015
	.336	− .000	.324	1.0 1.90 0.23	− .000	+ .005

Lalande 33439 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	29.334	−0.001	29.320	+1.0 x_2	−1.92 y	+0.24 z =	−0.004	+0.001
	.326	− .002	.311	1.0	1.92	0.24	− .013	− .008
	.338	+ .000	.325	1.0	1.93	0.25	+ .001	+ .006
S.	29.374	−0.001	29.337	+1.0 x_2	+1.79 y	+0.71 z =	+0.013	+0.006
	.360	− .000	.324	1.0	1.80	0.71	+ .000	− .007
	.368	− .001	.331	1.0	1.82	0.72	+ .007	+ .000
	.363	− .000	.327	1.0	1.83	0.72	+ .003	− .004
	.375	+ .002	.341	1.0	1.84	0.72	+ .017	+ .010
	.367	+ .001	.332	1.0	1.85	0.72	+ .008	+ .001
	.362	+ .001	.326	1.0	1.92	0.74	+ .002	− .005
	.366	− .000	.329	1.0	1.93	0.75	+ .005	− .002
S.	29.380	+0.000	29.320	+1.0 x_2	−1.84 y	+1.21 z =	−0.004	−0.000
	.383	+ .001	.323	1.0	1.87	1.22	− .001	+ .003
	.387	− .001	.325	1.0	1.88	1.22	+ .001	+ .005
	.375	+ .000	.314	1.0	1.88	1.22	− .010	− .006

Assumed Mean Difference: 29.324

				R		R	R	
Normals:	+4.00 x_1	+ 0.00 x_2	+ 7.51 y	− 1.06 z =	+0.003	*Solution:* x_1 =	−0.0044	±0.0046 Wt. 2.9
	+0.00	+20.00	− 7.82	+12.49 =	−0.002	x_2 =	+0.0001	±0.0035 5.0
	+7.51	− 7.82	+84.02	− 3.84 =	+0.211	y =	+0.0030	±0.0010 63.5
	−1.06	+12.49	− 3.84	+10.82 =	+0.011	z =	+0.0015	±0.0048 2.6

$[nn] = 0.00323$ $[vv] = 0.00267$ Prob. Error 1 Eq. = ±0.″099

$\pi = +0.″038$ ±0.″013

Taking into account the adopted systematic error we have the final value:—

Lalande 33439: $\pi = +0.″038 \pm 0.″017$

Lalande 34986	**B. D. +10°, 3665**	**Mag. 8.1**	**R. A. 18h 41.6m**	**Decl. +10° 36′**	**Pos. Angle.**
a	+10°, 3633	6.8	18 37.0	10 46	277°.7
b	+10°, 3720	7.0	18 47.5	10 38	88°.4

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908	Sept. 15	21	56	3−4	50	324.454	411.000	+0.002	−0.004	735.452
	21	21	35	2−3	54.5	.491	.046	.002	.004	.545
	28	21	19	3−4	52.5	.443	410.974	.002	.004	.415
	29	21	50	3	49.5	.464	411.008	.002	.004	.470
1909	Mar. 17	15	57	2	22.5	324.448	410.959	−0.001	+0.003	735.409
	18	15	32	1−2	23	.442	.942	.001	.003	.386
	19	15	41	1−2	32.5	.444	.948	.001	.003	.394
	22	15	28	3	22.5	.462	.962	.001	.003	.426
	23	15	39	3−4	28.5	.466	.968	.001	.003	.436
	26	15	35	3	26.5	.461	.982	.001	.003	.445
	28	15	46	2	32.5	.469	.974	.001	.003	.445
	31	16	5	2−3	32.5	.455	.968	.001	.003	.425
1909	Sept. 4	22	16	3	55	324.452	410.968	−0.004	+0.010	735.426
	5	21	54	2−3	54	.453	.978	.004	.010	.437
	6	21	40	2−3	60	.472	.998	.004	.010	.476

Lalande 34986 — *continued.*

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance α. R	Distance δ. R	P. M. Corrections. R	R	Corrected Sum. R
1909 Sept. 7	21 59	3	58	324.452	410.967	−0.004	+0.010	735.425
8	22 23	2	60	.470	.988	.004	.010	.464
17	22 22	3–4	61	.466	.998	.004	.010	.470
18	21 40	3–4	58	.477	411.001	.004	.010	.484
30	22 28	2	51	.456	410.989	.004	.010	.451
1910 Mar. 15	15 30	3–4	21.5	324.462	410.961	−0.007	+0.017	735.433
16	15 43	2–3	20.5	.458	.940	.007	.017	.408
17	15 15	3	16	.454	.934	.007	.017	.398
18	15 3	2–3	26.5	.474	.959	.007	.017	.443
Assumed Annual Proper Motion and Mean Sum:						+0.006	−0.014	735.440

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	86.546	−0.001	86.539	$+1.0\,x_1$	$+1.91\,y$	$-0.29\,z$	$= +0.015$	+0.007
	.545	− .012	.527	1.0	1.95	0.28	+ .003	− .005
	.531	+ .003	.528	1.0	1.96	0.26	+ .004	− .004
	.544	− .004	.534	1.0	1.96	0.26	+ .010	+ .002
S.	86.511	+0.004	86.519	$+1.0\,x_2$	$-1.92\,y$	$+0.21\,z$	$= -0.005$	+0.005
	.500	+ .006	.510	1.0	1.93	0.21	− .014	− .004
	.504	+ .005	.513	1.0	1.94	0.21	− .011	− .000
	.500	+ .002	.506	1.0	1.95	0.22	− .018	− .007
	.502	+ .000	.506	1.0	1.95	0.22	− .018	− .007
	.521	− .001	.524	1.0	1.96	0.23	− .000	+ .011
	.505	− .001	.508	1.0	1.96	0.24	− .016	− .005
	.513	+ .002	.519	1.0	1.96	0.25	− .005	+ .006
S.	86.516	+0.002	86.532	$+1.0\,x_2$	$+1.77\,y$	$+0.68\,z$	$= +0.008$	−0.003
	.525	+ .000	.539	1.0	1.79	0.68	+ .015	+ .004
	.526	− .004	.536	1.0	1.80	0.68	+ .012	+ .001
	.515	+ .002	.531	1.0	1.81	0.68	+ .007	− .004
	.518	− .003	.531	1.0	1.82	0.69	+ .007	− .004
	.532	− .004	.542	1.0	1.93	0.71	+ .018	+ .006
	.524	− .005	.533	1.0	1.93	0.71	+ .009	− .003
	.533	− .001	.546	1.0	1.96	0.75	+ .022	+ .010
S.	86.499	+0.001	86.524	$+1.0\,x_2$	$-1.90\,y$	$+1.20\,z$	$= -0.000$	+0.010
	.482	+ .004	.510	1.0	1.91	1.21	− .014	− .004
	.480	+ .005	.509	1.0	1.92	1.21	− .015	− .005
	.485	− .000	.509	1.0	1.93	1.21	− .015	− .005
Assumed Mean Difference:			86.524					

Normals:

				R
$+4.00\,x_1$	$+0.00\,x_2$	$+7.78\,y$	$-1.09\,z$	$= +0.032$
$+0.00$	$+20.00$	-8.42	$+12.20$	$= -0.033$
$+7.78$	-8.42	$+87.53$	-4.51	$= +0.474$
-1.09	$+12.20$	-4.51	$+10.39$	$= -0.013$

Solution:

	R	R	
x_1	$= -0.0032$	± 0.0025	Wt. 2.8
x_2	$= +0.0008$	± 0.0019	4.8
y	$= +0.0058$	± 0.0005	66.0
z	$= +0.0000$	± 0.0026	2.5

$[nn] = 0.00369$ $[vv] = 0.00078$ Prob. Error 1 Eq. $= \pm 0''.054$

$\pi = +0''.074 \pm 0''.006$

Including the adopted systematic error the final value is

Lalande 34986: $\pi = +0''.074 \pm 0''.014$

ϵ Cephei	B. D. +56°, 2741	Mag. 5.1	R. A. 22h 9.7m	Decl. +56° 19′	Pos. Angle.
a	+55°, 2679	6.8	22 1.1	55 38	240°.2
b	+57°, 2521	8.5	22 18.7	57 2	59°.7

	Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908	July	6	17	16	2–3	78	393.902	405.527	+0.017	−0.014	799.432
		7	17	52	2–3	66.5	.892	.537	.017	.014	.432
		8	16	47	3–4	61	.892	.516	.016	.014	.410
		9	17	0	2	60	.887	.522	.016	.014	.411
		10	16	46	2–3	64.5	.882	.528	.016	.014	.412
		26	18	7	3–4	67	.886	.514	.015	.012	.403
1908	Dec.	23	4	33	1–2	15	393.848	405.458	+0.001	−0.001	799.306
		31	3	56	2–3	27	.848	.456	.000	.000	.304
1909	Jan.	1	4	0	2	21	.860	.464	− .000	+ .000	.324
		2	4	24	2–3	26.5	.860	.498	.000	.000	.358
1909	Jan.	18	3	15	2–3	4.5	393.857	405.500	−0.002	+0.001	799.356
		19	4	14	2	20	.869	.524	.002	.001	.392
		20	3	45	1–2	28	.869	.497	.002	.001	.365
		21	4	11	3	33.5	.876	.542	.002	.002	.418
		22	3	41	1–2	37	.872	.510	.002	.002	.382
		26	4	8	3	30.5	.826	.471	.002	.002	.297
1909	June	26	18	12	3–4	73	393.932	405.500	−0.016	+0.014	799.430
		28	18	9	3	73	.928	.494	.017	.014	.419
		29	16	58	2	61	.918	.483	.017	.014	.398
		30	17	17	2	67.5	.912	.485	.017	.014	.394
	July	12	16	33	2	74	.920	.488	.018	.015	.405
		13	16	58	2	78	.918	.482	.018	.015	.397
								Assumed Annual Proper Motion and Mean Sum:	+0.034	−0.029	799.384

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Solution A. R	Residuals. Solution B. R	Solution C. R
S.	11.625	−0.001	11.593	$+1.0\,x_1 - 1.92\,y_1 - 0.49\,z =$	−0.024	−0.010	−0.001	−0.011
	.645	− .001	.613	1.0 1.92 0.49	− .004	+ .010	+ .019	+ .009
	.624	− .000	.594	1.0 1.91 0.48	− .023	− .009	− .000	− .010
	.635	− .000	.605	1.0 1.90 0.48	− .012	+ .001	+ .010	+ .001
	.646	− .000	.616	1.0 1.88 0.48	− .001	+ .012	+ .021	+ .012
	.628	− .000	.601	1.0 1.63 0.43	− .016	− .003	+ .004	− .005
S.	11.610	+0.001	11.609	$+1.0\,x_1 + 1.93\,y_1 - 0.02\,z =$	−0.008	−0.006	−0.020	−0.007
	.608	+ .001	.609	1.0 1.88 0.00	− .008	− .006	− .019	− .006
	.604	+ .001	.605	1.0 1.87 +0.00	− .012	− .010	− .023	− .010
	.638	+ .000	.638	1.0 1.87 0.01	+ .021	+ .023	+ .010	+ .024
S.	11.643	+0.000	11.646	$+1.0\,x_2 + 1.68\,y_2 + 0.05\,z =$	+0.029	−0.004	+0.006	−0.005
	.655	− .000	.658	1.0 1.67 0.05	+ .041	+ .008	+ .018	+ .008
	.628	+ .000	.631	1.0 1.65 0.05	+ .014	− .019	− .009	− .019
	.666	− .000	.670	1.0 1.63 0.06	+ .053	+ .021	+ .030	+ .021
	.638	+ .000	.642	1.0 1.61 0.06	+ .025	− .007	+ .002	− .007
	.645	+ .001	.650	1.0 1.52 0.07	+ .033	+ .002	+ .011	+ .002
S.	11.568	−0.001	11.597	$+1.0\,x_2 - 1.98\,y_2 + 0.48\,z =$	−0.020	−0.001	−0.010	−0.002
	.566	− .001	.596	1.0 1.97 0.49	− .021	− .002	− .012	− .003
	.565	− .000	.596	1.0 1.96 0.49	− .021	− .002	− .012	− .003
	.573	− .000	.604	1.0 1.96 0.49	− .013	+ .006	− .004	+ .005
	.568	− .000	.601	1.0 1.85 0.53	− .016	+ .001	− .008	+ .003
	.564	− .000	.597	1.0 1.84 0.53	− .020	− .003	− .012	− .001
Assumed Mean Difference:			11.617					

ϵ Cephei — *continued.*

					R
Normals:	$+10.00\,x_1$	$+\ 0.00\,x_2$	$-\ 3.61\,y_1$	$+\ 0.00\,y_2$	$-2.86\,z = -0.087$
	$+\ 0.00$	$+12.00$	$+\ 0.00$	$-\ 1.80$	$+3.35 = +0.084$
	$-\ 3.61$	$+\ 0.00$	$+35.08$	$+\ 0.00$	$+5.29 = +0.137$
	$+\ 0.00$	$-\ 1.80$	$+\ 0.00$	$+38.18$	$-5.25 = +0.529$
	$-\ 2.86$	$+\ 3.35$	$+\ 5.29$	$-\ 5.25$	$+2.87 = -0.007$

$[nn] = 0.01158$

Solution A

	R		R	
$x_1 =$	-0.0076	$+0.240\,z$	± 0.0024	Wt. 9.6
$x_2 =$	$+0.0092$	$-0.260\,z$	± 0.0021	11.9
$y_1 =$	$+0.0031$	$+0.126\,z$	± 0.0013	33.8
$y_2 =$	$+0.0142$	$+0.125\,z$	± 0.0012	37.9

$[vv] = 0.00213$ Prob. Error 1 Eq. $= \pm 0''.094$

$\pi = +0''.110 \pm 0''.011$

Solution B

	R		R	
$x_1 =$	-0.0054	$+0.289\,z$	± 0.0033	Wt. 9.8
$x_2 =$	$+0.0083$	$-0.278\,z$	± 0.0030	11.9
$y =$	$+0.0090$	$+0.007\,z$	± 0.0012	71.7

$[vv] = 0.00440$ Prob. Error 1 Eq. $= \pm 0''.131$

$\pi = +0''.114 \pm 0''.015$

Solution C

	R	R	
$x_1 =$	-0.0185	± 0.0031	Wt. 5.7
$x_2 =$	$+0.0210$	± 0.0030	6.4
$y =$	$+0.0087$	± 0.0009	71.5
$z =$	-0.0456	± 0.0075	1.1

$[vv] = 0.00223$ Prob. Error 1 Eq. $= \pm 0''.096$

$\pi = +0''.110 \pm 0''.011$

There appears to be little choice between *Solutions A* and *C*, both leading to an identical parallax value. The discrepancy between the two values y_1 and y_2 is, however, much larger than is warranted by their probable errors and thus the final result is rendered somewhat uncertain. With the adopted systematic error we have the final result:—

ϵ Cephei: $\pi = +0''.110 \pm 0''.015$

B. D. +58°, 2605	B. D. +58°, 2605	Mag. 7.5	R. A. $23^h\ 24.3^m$	Decl. +58° 20′	Pos. Angle.
a	+58°, 2581	8.5	23 14.7	58 59	296°.2
b	+58°, 2629	8.2	23 34.1	58 36	79°.4

Date.	Sid. Time. h. m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908 June 26	19 58	2–3	58°	401.217	365.224	+0.037	−0.039	766.439
28	19 59	2–3	56.5	.217	.250	.037	.038	.466
30	19 12	2–3	66.5	.228	.253	.037	.038	.480
July 3	18 50	1–2	71	.215	.236	.036	.037	.450
4	19 0	2–3	73	.268	.273	.035	.037	.539
5	18 19	3–4	74.5	.218	.255	.035	.037	.471
1908 Dec. 23	5 2	1–2	14	401.229	365.167	+0.001	−0.001	766.396
27	5 26	3–4	32	.277	.182	.001	.001	.459
31	4 23	2–3	27	.242	.159	.000	.000	.401
1909 Jan. 1	4 24	2	21	.238	.160	− .000	+ .000	.398
2	4 45	2–3	26	.256	.177	.001	.001	.433
1909 Jan. 20	4 42	1–2	28	401.287	365.244	−0.004	+0.004	766.531
21	4 37	3	33	.262	.224	.004	.004	.486
22	4 11	1–2	37	.254	.214	.004	.004	.468
23	5 44	1–2	31.5	.236	.182	.004	.004	.418
25	4 54	3–4	35	.248	.182	.005	.005	.430

B. D. +58°, 2605 — *continued.*

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance a. R	Distance δ. R	P. M. Corrections. R	R	Corrected Sum. R
1909	May 23	18	40	3–4	49	401.320	365.164	−0.028	+0.029	766.485
	25	18	45	2	45.5	.310	.151	.029	.030	.462
	31	17	55	3	58.5	.327	.169	.029	.031	.498
	June 16	18	34	3	54	.334	.180	.033	.035	.516
	July 9	17	42	2	59.5	.296	.133	.037	.039	.431
	9	18	29	2	59	.299	.149	.037	.039	.450
	10	17	30	2	62	.286	.124	.037	.039	.412
	10	17	56	2	61.5	.268	.140	.037	.039	.410
	11	18	12	2	63	.300	.162	.038	.040	.464
	11	18	49	2	62	.290	.146	.038	.040	.438
1909	Nov. 27	4	31	1–2	33	401.286	365.110	−0.066	+0.068	766.398
	28	4	26	1–2	37	.278	.108	.066	.068	.388
	30	4	14	3	23.5	.282	.112	.066	.068	.396
	Dec. 3	5	7	3	37	.334	.156	.066	.069	.493
	4	4	54	3	35	.326	.145	.067	.070	.474
	Assumed Annual Proper Motion and Mean Sum:							+0.072	−0.075	766.451

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. Solution A. R	Solution B. R	Solution C. R
S.	35.993	+0.001	36.070	$+1.0\,x_1$	$+1.58\,y_1$	$-0.52\,z$	$= +0.007$	+0.019	−0.003	+0.002
	.967	− .001	.041	1.0	1.56	0.51	− .022	− .010	− .032	− .028
	.975	− .001	.049	1.0	1.53	0.51	− .014	− .002	− .023	− .020
	.979	+ .000	.052	1.0	1.49	0.50	− .011	+ .000	− .020	− .017
	.995	− .004	.063	1.0	1.48	0.49	− .000	+ .011	− .009	− .006
	.963	− .001	.034	1.0	1.47	0.49	− .029	− .018	− .038	− .035
S.	36.062	+0.003	36.067	$+1.0\,x_1$	$-1.55\,y_1$	$-0.02\,z$	$= +0.004$	−0.015	+0.011	+0.007
	.095	− .000	.097	1.0	1.51	0.01	+ .034	+ .016	+ .041	+ .037
	.083	+ .002	.085	1.0	1.46	0.00	+ .022	+ .004	+ .028	+ .024
	.078	+ .002	.080	1.0	1.45	+0.00	+ .017	− .001	+ .023	+ .019
	.079	+ .001	.078	1.0	1.44	0.01	+ .015	− .003	+ .021	+ .016
S.	36.043	−0.004	36.031	$+1.0\,x_2$	$-1.10\,y_2$	$+0.05\,z$	$= -0.032$	−0.013	−0.023	−0.007
	.038	− .002	.028	1.0	1.08	0.06	− .035	− .016	− .026	− .010
	.040	− .001	.031	1.0	1.06	0.06	− .032	− .013	− .023	− .007
	.054	+ .002	.048	1.0	1.04	0.06	− .015	+ .003	− .007	+ .010
	.066	+ .001	.057	1.0	1.00	0.07	− .006	+ .012	+ .002	+ .018
S.	36.156	−0.001	36.098	$+1.0\,x_2$	$+1.68\,y_2$	$+0.39\,z$	$= +0.035$	+0.015	+0.029	+0.028
	.159	− .001	.099	1.0	1.70	0.40	+ .036	+ .016	+ .030	+ .029
	.158	− .002	.096	1.0	1.71	0.41	+ .033	+ .013	+ .027	+ .025
	.154	− .003	.083	1.0	1.67	0.46	+ .020	+ .000	+ .014	+ .011
	.163	+ .001	.088	1.0	1.40	0.52	+ .025	+ .009	+ .021	+ .016
	.150	+ .000	.074	1.0	1.40	0.52	+ .011	− .005	+ .007	+ .002
	.162	+ .002	.088	1.0	1.39	0.52	+ .025	+ .009	+ .021	+ .016
	.128	+ .002	.054	1.0	1.39	0.52	− .009	− .025	− .013	− .018
	.138	− .001	.059	1.0	1.37	0.53	− .004	− .020	− .008	− .013
	.144	+ .001	.067	1.0	1.37	0.53	+ .004	− .012	− .000	− .005
S.	36.176	+0.002	36.044	$+1.0\,x_2$	$-1.64\,y_2$	$+0.91\,z$	$= -0.019$	+0.008	−0.007	−0.016
	.170	+ .003	.033	1.0	1.64	0.91	− .024	+ .003	− .012	− .021
	.170	+ .003	.039	1.0	1.64	0.91	− .024	+ .003	− .012	− .021
	.178	− .002	.041	1.0	1.65	0.92	− .022	+ .005	− .010	− .019
	.181	− .001	.043	1.0	1.65	0.93	− .020	+ .007	− .008	− .018
	Assumed Mean Difference:		36.063							

R

Normals: $+11.00\,x_1 + 0.00\,x_2 + 1.70\,y_1 + 0.00\,y_2 - 3.04\,z = +0.023$

$+0.00 \quad +20.00 \quad +0.00 \quad +1.58 \quad +9.68 = -0.053$

$+1.70 \quad +0.00 \quad +24.82 \quad +0.00 \quad -4.55 = -0.239$

$+0.00 \quad +1.58 \quad +0.00 \quad +42.05 \quad -0.67 = +0.588$

$-3.04 \quad +9.68 \quad -4.55 \quad -0.67 \quad +8.06 = +0.004$

$[nn] = 0.01528$

B. D. +58°, 2605 — *continued.*

Solution A

	R		R	
x_1 =	+0.0036	+0.250 z	±0.0026	Wt. 10.9
x_2 =	−0.0038	−0.485 z	±0.0019	19.9
y_1 =	−0.0099	+0.165 z	±0.0017	24.6
y_2 =	+0.0141	+0.034 z	±0.0013	41.9

[vv] = 0.00433 Prob. Error 1 Eq. = ±0.″109

π_1 = +0.″027 ±0.″010

Solution B

	R		R	
x_1 =	+0.0013	+0.264 z	±0.0045	Wt. 11.0
x_2 =	−0.0030	−0.490 z	±0.0033	20.0
y =	+0.0053	+0.083 z	±0.0018	66.5

[vv] = 0.01316 Prob. Error 1 Eq. = ±0.″186

π_2 = +0.″067 ±0.″023

Solution C

	R		R	
x_1 =	+0.0094		±0.0048	Wt. 8.0
x_2 =	−0.0183		±0.0056	6.0
y =	+0.0078		±0.0019	54.5
z =	+0.0311		±0.0094	2.1

[vv] = 0.01120 Prob. Error 1 Eq. = ±0.″175

π = +0.″099 ±0.″024

The two values derived for y in *Solution A* are discordant far beyond their measure of uncertainty and the three solutions differ in like manner. Further series are in progress on this star. Provisionally we adopt *Solution C* and with the adopted systematic error we have: —

B. D. +58°, 2605: π = +0.″099 ±0.″020

B. D. +62°, 2244		B. D. +62°, 2244		Mag. 7.3	R. A. 23h 26.2m	Decl. +62° 21′	Pos. Angle.
a		+61°, 2423		7.2	23 13.2	61 56	254°.9
b		+62°, 2294		7.2	23 39.1	62 30	83°.9

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1908	July 6	17	54	2–3	78	448.459	425.130	+0.017	−0.016	873.590
	7	18	19	2–3	66.5	.447	.124	.017	.016	.572
	8	17	10	3–4	60	.464	.138	.016	.015	.603
	9	17	27	2	59	.452	.126	.016	.015	.579
	10	17	13	2–3	64	.442	.120	.016	.015	.563
	26	18	46	3–4	67	.477	.146	.015	.014	.621
1908	Dec. 23	5	52	1–2	13.5	448.428	425.068	+0.001	−0.001	873.496
	27	5	49	3–4	33	.465	.097	.000	.000	.562
1909	Jan. 1	4	47	2	20.5	.446	.053	− .000	+ .000	.499
	2	5	8	2–3	26	.444	.084	.000	.000	.528
1909	Jan. 19	5	29	2	20	448.454	425.093	−0.002	+0.002	873.547
	20	5	47	1–2	26.5	.448	.080	.002	.002	.528
	21	5	2	3	33	.444	.100	.002	.002	.544
	22	4	32	1–2	37	.440	.085	.002	.002	.525
	25	4	27	3–4	35	.461	.105	.002	.002	.566
	26	4	37	3	30	.422	.042	.002	.002	.464
1909	May 31	17	32	3	28.5	448.493	425.097	−0.014	+0.013	873.589
	June 16	18	34	3	54	.456	.083	.016	.015	.538
	24	17	25	3	76	.498	.104	.016	.015	.601
	26	18	38	3–4	72	.488	.096	.016	.015	.583
	July 9	18	4	2	59	.456	.068	.018	.017	.523
	9	18	53	2	58	.462	.055	.018	.017	.516
						Assumed Annual Proper Motion and Mean Sum:		+0.034	−0.032	873.552

B. D. +62°, 2244 — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Solution A.	Residuals. Solution B.	Solution C.
	R	R	R				R	R	R	R
S.	23.329	−0.001	23.361	$+1.0\,x_1$	$+1.84\,y_1$	$-0.49\,z$	$= +0.001$	+0.005	+0.001	+0.005
	.323	− .001	.355	1.0	1.84	0.49	− .005	− .001	− .005	− .001
	.326	− .001	.356	1.0	1.83	0.48	− .004	− .000	− .004	− .000
	.326	− .001	.356	1.0	1.82	0.48	− .004	− .000	− .004	− .000
	.322	− .000	.353	1.0	1.81	0.48	− .007	− .003	− .007	− .003
	.331	− .002	.358	1.0	1.59	0.43	− .002	+ .002	− .003	+ .002
S.	23.360	+0.002	23.364	$+1.0\,x_1$	$-1.83\,y_1$	$-0.02\,z$	$= +0.004$	−0.008	−0.002	−0.008
	.368	− .000	.368	1.0	1.82	0.01	+ .008	− .004	+ .002	− .004
	.393	+ .001	.394	1.0	1.80	0.00	+ .034	+ .022	+ .028	+ .022
	.360	+ .001	.361	1.0	1.79	+0.01	+ .001	− .011	− .005	− .011
S.	23.361	+0.000	23.357	$+1.0\,x_2$	$-1.60\,y_2$	$+0.05\,z$	$= -0.003$	−0.000	−0.004	+0.000
	.368	+ .001	.365	1.0	1.58	0.05	+ .005	+ .008	+ .004	+ .008
	.344	+ .000	.340	1.0	1.56	0.06	− .020	− .017	− .021	− .017
	.355	+ .001	.352	1.0	1.55	0.06	− .008	− .005	− .009	− .005
	.356	− .000	.352	1.0	1.50	0.07	− .008	− .005	− .009	− .005
	.380	+ .002	.378	1.0	1.48	0.07	+ .018	+ .021	+ .017	+ .021
S.	23.396	−0.001	23.368	$+1.0\,x_2$	$+1.79\,y_2$	$+0.41\,z$	$= +0.008$	+0.008	+0.012	+0.009
	.373	+ .000	.342	1.0	1.89	0.46	− .018	− .018	− .014	− .017
	.394	− .001	.362	1.0	1.89	0.48	+ .002	+ .002	+ .006	+ .002
	.392	− .001	.360	1.0	1.88	0.48	+ .000	+ .000	+ .004	+ .000
	.388	+ .001	.354	1.0	1.82	0.52	− .006	− .006	− .002	− .007
	.407	+ .001	.373	1.0	1.82	0.52	+ .013	+ .013	+ .017	+ .012

Assumed Mean Difference: 23.360

Normals:

				R
$+10.00\,x_1$	$+\ 0.00\,x_2$	$+\ 3.49\,y_1$	$+\ 0.00\,y_2$	$-2.87\,z = +0.026$
$+\ 0.00$	$+12.00$	$+\ 0.00$	$+\ 1.82$	$+3.23 = -0.017$
$+\ 3.49$	$+\ 0.00$	$+32.35$	$+\ 0.00$	$-5.06 = -0.122$
$+\ 0.00$	$+\ 1.82$	$+\ 0.00$	$+34.82$	$+4.77 = +0.022$
$-\ 2.87$	$+\ 3.23$	$-\ 5.06$	$+\ 4.77$	$+2.73 = +0.009$

$[nn] = 0.00281$

Solution A

	R		R		Solution B				
	R		R		R		R		
$x_1 =$	+0.0041	$+0.241\,z$	±0.0024	Wt. 9.6	+0.0032	$+0.299\,z$	±0.0026	Wt.	9.8
$x_2 =$	−0.0015	$-0.250\,z$	±0.0021	11.9	−0.0012	$-0.264\,z$	±0.0023		11.9
$y_1 =$	−0.0042	$+0.130\,z$	±0.0013	31.1					
$y_2 =$	+0.0007	$+0.124\,z$	±0.0013	34.5	−0.0016	$-0.034\,z$	±0.0010		65.7

$[vv] = 0.00216$ Prob. Error 1 Eq. = ±0.″094 $[vv] = 0.00256$ Prob. Error 1 Eq. = ±0.″102

$\pi = -0.''022 \pm 0.''009$ $\pi = -0.''020 \pm 0.''013$

Solution C

	R	R	
$x_1 =$	+0.0090	±0.0031	Wt. 5.5
$x_2 =$	−0.0068	±0.0028	6.5
$y =$	−0.0017	±0.0009	65.6
$z =$	+0.0294	±0.0072	1.0

$[vv] = 0.00204$ Prob. Error 1 Eq. = ±0.″091

$\pi = -0.''022 \pm 0.''011$

The various solutions for this star indicate fairly sufficient homogeneity and hence *Solution C* may be considered final, and using the adopted systematic error we have as the final result: —

B. D. +62°, 2244: $\pi = -0.''022 \pm 0.''016$

§ 19. Three Pleiades Stars. Smith.

On the completion of the Second Yale Triangulation of the Pleiades, the confirmation of the result reached by Dr. Elkin, that several stars were only optical members of the group, seemed assured. It appeared, therefore, of some interest to attempt a parallax investigation of the group referred to these stars. But no favorable combinations seemed available and it was decided to determine the parallax of one of these stars, No. 36 of Dr. Elkin's list, referred to two comparison stars belonging to the group, which were Nos. 8 and 62. At the same time the adjacent star No. 43, which moves with the group, and No. 46, which has a peculiar motion of its own, were taken, referred to the same comparison stars. If the group were nearer to us than the stars on which it is projected and which are apparently nearly at rest, we should then expect a negative parallax for No. 36. For No. 43, as forming a member of the group, we should expect a parallax zero, if the observations were entirely free from error. For No. 46, we could only infer its belonging to the group, or otherwise, if its parallax came out zero or of appreciable value. These three series were carried out as follows: —

Pleiades Star 36 E.	**B. D. +23°, 535**	**Mag. 7.9**	**R. A. 3^h 38.7^m**	**Decl. 23° 16′**	**Pos. Angle.**
a	+23°, 509	8.6	3 36.5	23 15	266°.9
b	+23°, 563	7.2	3 40.7	23 16	91°.0

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1904 Mar. 12	6	8	2–3	29	143.368	158.184	0.000	0.000	301.552
13	7	30	3	29	.369	.196	.000	.000	.565
20	7	31	3–4	35.5	.362	.192	.000	.000	.554
24	8	3	3	39	.403	.180	.000	.000	.583
1904 Aug. 15	23	43	3	64.5	143.390	158.206	0.000	0.000	301.596
21	0	21	3	61	.383	.202	.000	.000	.585
23	0	34	3	58	.372	.198	.000	.000	.570
26	23	40	3	55	.377	.206	.000	.000	.583
Sept. 7	0	13	3–4	56	.402	.206	.000	.000	.608
17	23	55	3	61.5	.379	.219	.000	.000	.598
21	23	29	3	40.5	.373	.204	.000	.000	.577
22	23	59	2	39	.365	.203	.000	.000	.568
Oct. 1	23	24	3	50	.370	.208	.000	.000	.578
3	0	55	2	45	.384	.198	.000	.000	.582
15	0	18	2	42	.372	.223	.000	.000	.595
16	23	51	2	46	.383	.203	.000	.000	.586
17	0	30	2	51	.386	.194	.000	.000	.580
1905 Feb. 2	7	8	2–3	9	143.375	158.196	0.000	0.000	301.571
24	7	7	3–4	30.5	.349	.182	.000	.000	.531
Mar. 1	7	35	3	21	.367	.174	.000	.000	.541
2	7	14	3–4	23	.379	.188	.000	.000	.567
4	7	2	3–4	24.5	.363	.174	.000	.000	.537
6	7	10	2	23.5	.374	.187	.000	.000	.561
10	7	30	3	38	.376	.197	.000	.000	.573
13	6	58	2	26	.378	.191	.000	.000	.569
15	7	1	2	29	.366	.193	.000	.000	.559
16	7	8	2–3	34	.385	.188	.000	.000	.573
17	7	54	3	33	.360	.207	.000	.000	.567
23	7	39	3–4	33	.363	.199	.000	.000	.562

Pleiades Star 36 E. — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance α. R	Distance δ. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1905	Sept. 7	23 51	3–4	60	143.409	158.208	0.000	0.000	301.617
	9	0 28	3–4	60	.393	.195	.000	.000	.588
	13	0 11	3	53	.384	.203	.000	.000	.587
	14	0 16	2	47	.379	.198	.000	.000	.577
	26	23 39	3–4	43	.391	.204	.000	.000	.595
	28	0 8	3	60	.394	.213	.000	.000	.607
1906	Feb. 9	7 58	3–4	18	143.377	158.198	0.000	0.000	301.575
	Mar. 22	8 3	3	25	.370	.207	.000	.000	.577
	23	8 3	3–4	16	.362	.183	.000	.000	.545
		Assumed Annual Proper Motion and Mean Sum:					0.000	0.000	301.574

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	14.816	+0.001	14.817	$+1.0\,x$	$+1.75\,y$	$-0.81\,z$	$= -0.003$	−0.004
	.827	+ .000	.827	1.0	1.73	0.80	+ .007	+ .006
	.830	+ .001	.831	1.0	1.65	0.78	+ .011	+ .010
	.777	− .000	.777	1.0	1.55	0.77	− .043	− .044
S.	14.816	−0.001	14.815	$+1.0\,x$	$-1.96\,y$	$-0.38\,z$	$= -0.005$	−0.006
	.819	− .001	.818	1.0	1.96	0.36	− .002	− .003
	.826	+ .000	.826	1.0	1.96	0.36	+ .006	+ .005
	.829	− .000	.829	1.0	1.95	0.35	+ .009	+ .009
	.804	− .002	.802	1.0	1.88	0.32	− .018	− .019
	.840	− .001	.839	1.0	1.73	0.29	+ .019	+ .018
	.831	− .000	.831	1.0	1.66	0.28	+ .011	+ .010
	.838	+ .000	.838	1.0	1.64	0.27	+ .018	+ .017
	.838	− .000	.838	1.0	1.46	0.25	+ .018	+ .017
	.814	− .000	.814	1.0	1.42	0.24	− .006	− .007
	.851	− .001	.850	1.0	1.10	0.21	+ .030	+ .029
	.820	− .001	.819	1.0	1.07	0.21	− .001	− .002
	.808	− .000	.808	1.0	1.04	0.21	− .012	− .013
S.	14.821	+0.000	14.821	$+1.0\,x$	$+1.91\,y$	$+0.09\,z$	$= +0.001$	+0.001
	.833	+ .002	.835	1.0	1.88	0.15	+ .015	+ .015
	.807	+ .002	.809	1.0	1.84	0.16	− .011	− .011
	.809	+ .000	.809	1.0	1.83	0.17	− .011	− .011
	.811	+ .002	.813	1.0	1.81	0.17	− .007	− .007
	.813	+ .001	.814	1.0	1.80	0.18	− .006	− .006
	.821	+ .000	.821	1.0	1.77	0.19	+ .001	+ .001
	.813	+ .000	.813	1.0	1.73	0.20	− .007	− .007
	.827	+ .001	.828	1.0	1.71	0.20	+ .008	+ .008
	.803	+ .000	.803	1.0	1.70	0.21	− .017	− .017
	.847	+ .000	.847	1.0	1.69	0.21	+ .027	+ .027
	.836	+ .000	.836	1.0	1.58	0.22	+ .016	+ .016
S.	14.799	−0.002	14.797	$+1.0\,x$	$-1.88\,y$	$+0.68\,z$	$= -0.023$	−0.023
	.802	− .000	.802	1.0	1.85	0.69	− .018	− .018
	.819	− .000	.819	1.0	1.79	0.70	− .001	− .001
	.819	− .000	.819	1.0	1.78	0.70	− .001	− .001
	.813	− .000	.813	1.0	1.57	0.74	− .007	− .007
	.819	− .002	.817	1.0	1.53	0.74	− .003	− .003
S.	14.821	−0.000	14.821	$+1.0\,x$	$+1.91\,y$	$+1.11\,z$	$= +0.001$	+0.001
	.837	− .000	.837	1.0	1.60	1.22	+ .017	+ .017
	.821	+ .001	.822	1.0	1.58	1.22	+ .002	+ .002
	Assumed Mean Difference:		14.820					

Pleiades Star 36 E. — *continued.*

Normals:

				R
+38.00 x	+ 1.79 y	+ 3.06 z	=	+0.016
+ 1.79	+110.60	+ 3.33	=	−0.002
+ 3.06	+ 3.33	+11.22	=	−0.007

Solution:

	R	R	
x =	+0.0005	±0.0016	Wt. 37.2
y =	−0.0000	±0.0010	109.6
z =	−0.0008	±0.0031	10.9

$[nn] = 0.00783$ $[vv] = 0.00782$ Prob. Error 1 Eq. = ±0.″128

$\pi = -0.″000$ ±0.″013

Pleiades Star 43 E. B. D. +23°, 539 Mag. 8.0 R. A. 3h 38.9m Decl. +23° 13′ Pos. Angle.

a	+23°, 509	8.6	3 36.5	23 15	272°.0
b	+23°, 563	7.2	3 40.7	23 16	85°.9

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1904 Mar. 12	7 34	2–3	29	153.479	148.423	0.000	0.000	301.902
13	6 43	3	31	.470	.406	.000	.000	.876
20	8 4	3–4	34	.467	.410	.000	.000	.877
29	7 49	3–4	34	.467	.401	.000	.000	.868
1904 Aug. 15	0 12	3	64.5	153.475	148.433	0.000	0.000	301.908
21	23 26	3	64	.477	.434	.000	.000	.911
23	0 12	3	58	.481	.420	.000	.000	.901
26	0 3	3	54.5	.491	.428	.000	.000	.919
Sept. 7	23 25	3–4	57	.507	.439	.000	.000	.946
17	0 22	3	61	.486	.437	.000	.000	.923
21	23 54	3	39	.479	.421	.000	.000	.900
22	23 16	2	40	.463	.407	.000	.000	.870
Oct. 3	0 19	2	45	.471	.403	.000	.000	.874
6	0 12	3–4	40.5	.470	.409	.000	.000	.879
15	0 45	2	40	.479	.413	.000	.000	.892
16	0 15	2	45	.471	.421	.000	.000	.892
22	23 59	3	48	.487	.439	.000	.000	.926
1905 Feb. 2	7 37	2–3	9	153.451	148.408	0.000	0.000	301.859
24	7 39	3–4	30	.443	.401	.000	.000	.844
Mar. 1	8 2	3	20	.459	.388	.000	.000	.847
2	7 50	3–4	22	.468	.423	.000	.000	.891
4	7 31	3–4	23	.485	.396	.000	.000	.881
6	7 31	2	23	.472	.400	.000	.000	.872
10	8 1	3	38	.477	.411	.000	.000	.888
13	7 22	2	26	.476	.398	.000	.000	.874
15	7 22	2	29	.464	.403	.000	.000	.867
17	7 10	3–4	34	.471	.397	.000	.000	.868
23	8 4	3–4	33	.475	.411	.000	.000	.886
Apr. 2	8 27	3	40	.486	.400	.000	.000	.886
1905 Sept. 7	0 17	3–4	60	153.484	148.426	0.000	0.000	301.910
9	23 32	3–4	60	.496	.434	.000	.000	.930
13	0 36	3	52	.490	.423	.000	.000	.913
14	0 39	3	46	.493	.434	.000	.000	.927
26	0 22	4	43	.473	.417	.000	.000	.890
28	23 46	3	60.5	.467	.421	.000	.000	.888
29	0 30	3	62	.487	.426	.000	.000	.913
1906 Feb. 17	7 18	2	23	153.477	148.401	0.000	0.000	301.878
Mar. 22	7 38	3	25	.484	.400	.000	.000	.884
23	8 24	3–4	15	.481	.417	.000	.000	.898
24	7 23	2	20	.475	.412	.000	.000	.887
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	301.891

Pleiades Star 43 E. — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	5.056	−0.000	5.056	+1.0 x	−1.73 y	−0.81 z =	−0.006	−0.005
	.064	+ .000	.064	1.0	1.70	0.80	+ .002	+ .003
	.057	+ .000	.057	1.0	1.65	0.78	− .005	− .004
	.066	+ .000	.066	1.0	1.43	0.76	+ .004	+ .005
S.	5.042	−0.000	5.042	+1.0 x	+1.96 y	−0.38 z =	−0.020	−0.012
	.043	− .000	.043	1.0	1.96	0.36	− .019	− .011
	.061	− .000	.061	1.0	1.96	0.36	− .001	+ .007
	.063	− .000	.063	1.0	1.95	0.35	+ .001	+ .009
	.068	− .001	.067	1.0	1.88	0.31	+ .005	+ .013
	.049	− .001	.048	1.0	1.73	0.29	− .014	− .007
	.058	− .000	.058	1.0	1.66	0.28	− .004	+ .003
	.056	+ .000	.056	1.0	1.64	0.27	− .006	+ .000
	.068	+ .000	.068	1.0	1.41	0.24	+ .006	+ .012
	.061	+ .000	.061	1.0	1.34	0.23	− .001	+ .005
	.066	− .000	.066	1.0	1.09	0.21	+ .004	+ .009
	.050	− .000	.050	1.0	1.06	0.21	− .012	− .007
	.048	− .001	.047	1.0	0.90	0.19	− .015	− .011
S.	5.043	+0.001	5.044	+1.0 x	−1.91 y	+0.09 z =	−0.018	−0.022
	.042	+ .001	.043	1.0	1.88	0.15	− .019	− .023
	.071	+ .001	.072	1.0	1.85	0.16	+ .010	+ .006
	.045	+ .000	.045	1.0	1.83	0.17	− .017	− .021
	.089	+ .000	.089	1.0	1.82	0.17	+ .027	+ .023
	.072	+ .000	.072	1.0	1.80	0.18	+ .010	+ .006
	.066	+ .000	.066	1.0	1.77	0.19	+ .004	− .000
	.078	+ .000	.078	1.0	1.73	0.20	+ .016	+ .012
	.061	+ .000	.061	1.0	1.71	0.20	− .001	− .005
	.074	+ .000	.074	1.0	1.69	0.21	+ .012	+ .008
	.064	+ .000	.064	1.0	1.58	0.23	+ .002	− .002
	.086	+ .000	.086	1.0	1.33	0.25	+ .024	+ .021
S.	5.058	−0.000	5.058	+1.0 x	+1.88 y	+0.69 z =	−0.004	−0.002
	.062	− .001	.061	1.0	1.85	0.69	− .001	+ .001
	.067	− .000	.067	1.0	1.79	0.70	+ .005	+ .007
	.059	− .001	.058	1.0	1.78	0.70	− .004	− .002
	.056	+ .000	.056	1.0	1.56	0.74	− .006	− .005
	.046	+ .000	.046	1.0	1.52	0.74	− .016	− .015
	.061	− .000	.061	1.0	1.49	0.74	− .001	+ .000
S.	5.076	+0.000	5.076	+1.0 x	−1.91 y	+1.13 z =	+0.014	+0.005
	.084	+ .000	.084	1.0	1.60	1.22	+ .022	+ .013
	.067	− .000	.067	1.0	1.58	1.22	+ .005	− .004
	.063	+ .000	.063	1.0	1.55	1.23	+ .001	− .008
	Assumed Mean Difference:		5.062					

				R			R	R	
Normals:	+40.00 x	− 1.64 y	+ 5.17 z	= −0.016	*Solution:*	x =	−0.0011	±0.0012	Wt. 38.0
	− 1.64	+112.92	− 4.22	= −0.301		y =	−0.0025	±0.0007	111.6
	+ 5.17	− 4.22	+13.36	= +0.071		z =	+0.0049	±0.0021	12.5

$[nn] = 0.00550$ $[vv] = 0.00443$ Prob. Error 1 Eq. = ±0.″092

$\pi = -0.″032 \pm 0.″009$

Pleiades Star 46 E.	B. D. +23°, 542	Mag. 8.2	R. A. $3^h\ 39.0^m$	Decl. +23° 9′	Pos. Angle.
a	+23°, 509	8.6	3 36.5	23 15	278°.7
b	+23°, 563	7.2	3 40.7	23 16	77°.6

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1904 Mar. 12	8 7	2–3	29	165.189	140.470	0.000	0.000	305.659
13	7 6	3	30	.180	.473	.000	.000	.653
20	7 5	3–4	37	.199	.472	.000	.000	.671
Apr. 4	8 19	3	44.5	.188	.442	.000	.000	.630
1904 Aug. 15	0 37	3	64.5	165.231	140.488	0.000	0.000	305.719
21	23 53	3	63	.211	.469	.000	.000	.680
23	23 51	3	58	.235	.461	.000	.000	.696
26	0 24	3	54	.223	.460	.000	.000	.683
Sept. 7	23 50	3–4	56.5	.235	.498	.000	.000	.733
17	23 33	3	62	.235	.470	.000	.000	.705
21	0 30	3	38	.235	.472	.000	.000	.707
22	23 38	2	39.5	.217	.477	.000	.000	.694
23	0 39	1–2	52	.224	.462	.000	.000	.686
Oct. 3	0 36	2	45	.214	.474	.000	.000	.688
14	23 13	2	50	.222	.463	.000	.000	.685
16	23 28	2	47	.223	.459	.000	.000	.682
17	0 1	2	54	.217	.479	.000	.000	.696
22	0 21	3	46.5	.221	.471	.000	.000	.692
1905 Feb. 18	7 24	2–3	18	165.186	140.428	0.000	0.000	305.614
Mar. 1	7 7	3	22	.170	.456	.000	.000	.626
2	6 52	3–4	24	.191	.468	.000	.000	.659
3	7 12	3	27	.200	.467	.000	.000	.667
4	8 5	3–4	22	.207	.453	.000	.000	.660
6	7 57	2	23	.187	.478	.000	.000	.665
11	7 20	2	28	.180	.458	.000	.000	.638
13	8 3	2–3	26	.200	.450	.000	.000	.650
15	7 42	2	29	.184	.459	.000	.000	.643
17	7 33	3–4	33	.197	.475	.000	.000	.672
27	7 53	3–4	54	.201	.476	.000	.000	.677
29	8 14	3–4	50	.227	.454	.000	.000	.681
1905 Sept. 7	0 38	3–4	60	165.206	140.463	0.000	0.000	305.669
9	0 2	3–4	60	.208	.463	.000	.000	.671
13	23 40	3	54	.213	.466	.000	.000	.679
25	23 54	3–4	46	.206	.468	.000	.000	.674
28	23 26	3	61	.227	.479	.000	.000	.706
1906 Mar. 22	7 15	3	26	165.188	140.459	0.000	0.000	305.647
23	7 33	3–4	17	.195	.462	.000	.000	.657
24	7 48	2	19	.216	.458	.000	.000	.674
				Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	305.673

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	24.719	+0.001	24.720	$+1.0\,x - 1.72\,y - 0.81\,z =$	−0.020	−0.012
	.707	+ .002	.709	1.0 1.71 0.80	− .031	− .023
	.727	+ .000	.727	1.0 1.63 0.78	− .013	− .006
	.746	+ .003	.749	1.0 1.28 0.74	+ .009	+ .015
S.	24.743	−0.004	24.739	$+1.0\,x + 1.94\,y - 0.38\,z =$	−0.001	−0.011
	.742	− .000	.742	1.0 1.94 0.36	+ .002	− .008
	.774	− .002	.772	1.0 1.94 0.36	+ .032	+ .022
	.763	− .001	.762	1.0 1.93 0.35	+ .022	+ .012
	.737	− .005	.732	1.0 1.86 0.31	− .008	− .018
	.765	− .003	.762	1.0 1.71 0.29	+ .022	+ .013

Pleiades Star 46 E. — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.				Residuals.
	R	R	R				R	R
S.	24.763	−0.003	24.760	+1.0 x	+1.64 y	−0.28 z	= +0.020	+0.011
	.740	− .002	.738	1.0	1.62	0.27	− .002	− .011
	.762	− .001	.761	1.0	1.60	0.27	+ .021	+ .012
	.740	− .001	.739	1.0	1.39	0.24	− .001	− .009
	.759	− .001	.758	1.0	1.10	0.21	+ .018	+ .012
	.764	− .001	.763	1.0	1.04	0.21	+ .023	+ .017
	.738	− .002	.736	1.0	1.01	0.21	− .004	− .010
	.750	− .001	.749	1.0	0.88	0.19	+ .009	+ .004
S.	24.758	+0.005	24.763	+1.0 x	−1.89 y	+0.13 z	= +0.023	+0.030
	.714	+ .004	.718	1.0	1.82	0.16	− .022	− .016
	.723	+ .001	.724	1.0	1.81	0.17	− .016	− .010
	.733	+ .000	.733	1.0	1.80	0.17	− .007	− .001
	.754	+ .001	.755	1.0	1.79	0.17	+ .015	+ .021
	.709	+ .001	.710	1.0	1.78	0.18	− .030	− .024
	.722	+ .003	.725	1.0	1.73	0.19	− .015	− .009
	.750	+ .002	.752	1.0	1.71	0.20	+ .012	+ .018
	.725	+ .002	.727	1.0	1.69	0.20	− .013	− .007
	.722	+ .000	.722	1.0	1.66	0.21	− .018	− .013
	.725	− .000	.725	1.0	1.46	0.24	− .015	− .011
	.773	− .001	.772	1.0	1.41	0.24	+ .032	+ .036
S.	24.743	+0.000	24.743	+1.0 x	+1.86 y	+0.69 z	= +0.003	−0.009
	.745	+ .000	.745	1.0	1.83	0.69	+ .005	− .007
	.747	− .000	.747	1.0	1.77	0.70	+ .007	− .004
	.738	− .000	.738	1.0	1.56	0.74	− .002	− .013
	.748	− .003	.745	1.0	1.50	0.74	+ .005	− .005
S.	24.729	+0.002	24.731	+1.0 x	−1.58 y	+1.22 z	= −0.009	−0.006
	.733	+ .001	.734	1.0	1.56	1.22	− .006	− .003
	.758	− .000	.758	1.0	1.53	1.23	+ .018	+ .021
	Assumed Mean Difference:		24.740					

Normals:				R	*Solution:*	R	R	
+38.00 x	− 1.44 y	+ 2.43 z	=	+0.065	x =	+0.0018	±0.0017	Wt. 37.5
− 1.44	+102.75	− 4.91	=	+0.461	y =	+0.0046	±0.0010	100.6
+ 2.43	− 4.91	+11.09	=	+0.004	z =	+0.0021	±0.0032	10.7

$[nn] = 0.01053$ $[vv] = 0.00840$ Prob. Error 1 Eq. = ±″0.133

π = +″0.058 ±″0.013

The results, however, are unfortunately not entirely conclusive, except as to the minuteness of all the parallaxes involved. For No. 36, the value 0″.00 would imply that the group is apparently at the same distance as this star which does not partake of its motion. For No. 43, the value −0″.03 would give a possible limit of systematic error. As for No. 46, the value +0″.06 would lead us to infer its greater proximity and hence its non-membership with the group, and this result would seem to be fairly assured.

§ 20. Final Results.

In all the preceding work equal weights were given to each observation irrespective of the seeing conditions, which assumption, as seen on page 192, was shown for our earlier work to be fairly well justified. Whether the same is true for the present list will be apparent from the following tables, in which are given the means of the residuals classified as before, viz.: —

Class I: Where the main star and both comparison stars are brighter than magnitude 8.0.
" II: Where the main star and only one comparison star are brighter than magnitude 8.0.
" III: Where the main star or both comparison stars are fainter than magnitude 8.0.
" IV: Where only one comparison star was employed.

Chase.	Def. 1 & 1–2.	No. Obs.	Def. 2.	No. Obs.	Def. 2–3.	No. Obs.	Def. 3.	No. Obs.	Def. 3–4.	No. Obs.
	R		R		R		R		R	
Class I	0.0115	6	0.0120	26	0.0127	24	0.0117	48	0.0109	47
" II	0.0088	22	0.0110	80	0.0137	108	0.0113	78	0.0147	73
" III	0.0085	29	0.0109	59	0.0123	58	0.0117	38	0.0123	24

Smith.	Def. 1 & 1–2.	No. Obs.	Def. 2.	No. Obs.	Def. 2–3.	No. Obs.	Def. 3.	No. Obs.	Def. 3–4.	No. Obs.
	R		R		R		R		R	
Class I	0.0104	19	0.0088	70	0.0085	27	0.0101	99	0.0103	71
" II	0.0070	23	0.0078	75	0.0098	44	0.0112	68	0.0117	54
" III	0.0076	30	0.0087	54	0.0103	29	0.0107	55	0.0134	54
" IV	0.0085	2	0.0039	14	0.0051	7	0.0083	13	0.0067	11

It thus appears that for Class I and Class IV the assumption of equal weights is warranted, but hardly so for classes II and III. Nevertheless it has not been deemed necessary to re-solve the equations of condition with their proper weights, since for most of the series the good and bad seeing was tolerably well distributed through the various epochs. Yet to assure ourselves that no great change would result thereby approximate solutions with the proper weights have been made for a number of the most questionable cases and no alteration in the parallax result as large as 0″.005 has been found.

The following table gives the collected data and final results, in the form explained on page 195, of all the thirty-five selected stars, except the three of the Pleiades group, and includes the revised values of the two stars 54 Piscium and Lalande 43492. Under the heading Magnitude, however, we have added also the Potsdam determination.

Collected Final Results.

Page.	Star.	Magnitude. B.D.	P.	H.R.	D.C.	Spect.	R. A. 1900.0 h	m	Decl. 1900.0 °	′	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Obs.
297	β Cassiopeiae	2.2	2.6	2.4	3.6	F5	0	3.8	+58	36	+0.066	−0.19	0.55	+0.051	±0.015	S. 22
262	Groombridge 34	8.1	—	—	—	—		12.7	43	27	+0.260	+0.39	2.85	+0.306	0.008	C. 48
295	54 Piscium	6.2	6.1	6.1	6.5	K		34.2	20	43	−0.034	−0.38	0.61	+0.131	0.014	C. 56
299	Lalande 2682	7.8	—	—	—	—	1	23.6	21	13	+0.035	−0.19	0.53	+0.000	0.020	S. 24
300	Lalande 3022	7.8	—	—	—	—		33.9	27	36	+0.038	+0.13	0.52	+0.037	0.017	S. 24
278	γ_1 Andromedae	2.0	2.4	2.3	4.1	Kp		57.8	41	51	+0.005	−0.05	0.07	+0.002	0.009	C. 56
301	γ_2 Ceti	3.5	3.8	3.6	3.9	A	2	38.1	2	49	−0.011	−0.16	0.23	+0.119	0.017	S. 24
303	Weisse 2^h, 927	8.2	—	—	—	—		55.2	5	36	+0.044	−0.15	9.68	+0.088	0.015	S. 24
279	γ Orionis	2.0	2.1	1.7	—	B2	5	19.8	6	16	−0.000	−0.02	0.02	−0.010	0.011	C. 44
279	α_2 Geminorum	1.7	1.9	2.0	—	A	7	28.2	32	7	−0.014	−0.08	0.20	+0.022	0.012	S. 40
281	Lalande 19896	7.8	—	—	—	—	10	8.9	3	39	+0.016	−0.40	0.47	−0.058	0.016	S. 36
279	γ Leonis	2.0	2.4	2.3	3.7	K		14.5	20	21	+0.021	−0.15	0.33	−0.046	0.013	S. 49
259	Lalande 21185	7.3	7.6	7.6	—	—		57.9	36	39	−0.044	−4.74	4.77	+0.392	0.009	C. 63
254	Groombridge 1830	6.5	6.6	6.5	6.6	Gp	11	47.2	38	27	+0.344	−5.80	7.07	+0.073	0.009	C. 75 S. 50
283	33 Virginis	6.4	5.7	5.9	6.4	K	12	41.3	10	6	+0.018	−0.45	0.52	−0.010	0.016	C. 42
279	ζ_1 Ursae Majoris	2.0	2.4	2.4	—	Ap	13	19.9	55	27	+0.015	−0.03	0.13	+0.007	0.011	S. 48
236	α Bootis	1.0	0.2	0.2	—	K	14	11.1	19	43	−0.078	−2.00	2.29	+0.066	0.006	C. 154 S. 123 E. 126
286	5 Serpentis	5.0	5.2	5.2	5.3	G	15	14.2	2	9	+0.024	−0.54	0.65	+0.086	0.014	S. 46
304	Lalande 29917	8.6	—	—	—	—	16	16.5	67	29	−0.084	+0.10	0.49	+0.144	0.017	S. 24
305	Lalande 30271	7.2	7.2	7.3	—	—		32.6	31	10	+0.002	−0.49	0.49	+0.003	0.016	S. 24
289	Weisse 17^h, 322	8.0	—	—	—	—	17	20.8	2	14	−0.040	−1.22	1.36	+0.134	.0.010	C. 102
279	α Ophiuchi	2.0	2.5	2.1	2.9	A5		30.3	12	38	+0.008	−0.23	0.25	+0.066	0.011	S. 48
307	30 Draconis	5.0	5.3	5.2	5.2	A		46.7	50	48	−0.006	+0.20	0.21	+0.008	0.015	S. 24
308	Lalande 33439	6.7	6.6	6.4	7.0	G	18	6.3	38	27	−0.035	−0.50	0.65	+0.038	0.017	S. 24
309	Lalande 34986	8.1	—	—	—	—		43.8	10	39	+0.009	−0.47	0.49	+0.074	0.014	S. 24
255	σ Draconis	5.0	4.9	4.8	5.5	G5	19	32.5	69	30	+0.100	−1.76	1.84	+0.243	0.018	S. 21
290	Weisse 20^h, 1454	8.2	—	—	—	—	20	59.1	2	36	−0.025	−0.41	0.55	−0.075	0.013	S. 28
244	61 Cygni	5.0 5.3	5.4 6.1	5.6 6.3	6.2	K5	21	2.4	38	16	+0.344	+3.23	5.18	+0.291	0.005	C. 230
292	Weisse 21^h, 97	7.3	7.6	7.3	—	—		7.4	17	21	−0.009	−0.90	0.91	−0.008	0.016	S. 33
311	ϵ Cephei	5.1	4.4	4.2	4.6	A5	22	11.3	56	33	+0.054	+0.04	0.45	+0.110	0.015	S. 22
295	Lalande 43492	7.0	7.2	6.9	6.6	—		12.2	12	24	+0.057	+0.09	0.84	−0.047	0.046	C. 11
313	B. D. +58°, 2605	7.5	6.9	6.8	6.6	—	23	26.4	58	37	+0.138	+0.08	1.08	+0.099	0.020	S. 31
314	B. D. +62°, 2244	7.3	7.7	7.4	—	—		28.2	62	36	+0.064	−0.00	0.44	−0.022	0.016	S. 22
294	Lalande 46650	8.7	—	—	—	—		44.0	1	52	+0.065	−1.00	1.39	+0.185	0.016	E. 11 S. 34

§ 21. General Conclusions.

As before, we have considered it of interest to bring together all of our final results hitherto derived, arranged according to proper motion and with a more extended sub-division as to magnitude, thus replacing Tables I and II (pages 200 and 201) by the one on the following page.

In view of the considerable range of existing opinion as regards the parallaxes of the comparison stars and the pending questions as to light absorption in interstellar space we have not considered it worth while at present to derive values for the average velocity and luminosity.

Regarding the proper motions of the comparison stars we have not carried out an exhaustive search for such; the following are, however, the only ones in addition to those on page 206 where a value exceeding 0″.10 appears to be possibly indicated, and of these only the unqueried ones are well assured.

Groombridge 34, *a*	P. M.: 0″.15	?	B. D. +43°, 10
Lalande 21185, *a*	0.25	?	+37°, 2139
γ_1 Andromedae, *d*	0.15	?	+42°, 451
γ Orionis, *b*	0.15	?	+ 6°, 938
Lalande 19896, *b*	0.22		+ 4°, 2313
Weisse 20^h, 1454, *a*	0.19		+ 2°, 4294
Weisse 20^h, 1454, *b*	0.20	?	+ 2°, 4297

Results arranged according to Proper Motion and Magnitude.

P. M. : 0.″00 — 0.″34			
Page	Mag.	P. M.	Par.
		″	″
Mag. 0.0 — 2.5			
38	2.3	0.02	+0.04
154	2.5	0.02	+0.10
199	1.0	0.20	+0.11
199	0.8	0.02	+0.02
199	1.4	0.26	+0.02
199	0.4	0.34	+0.08
199	1.5	0.01	−0.01
278	2.4	0.07	+0.00
279	1.9	0.02	−0.01
279	1.9	0.20	+0.02
279	2.4	0.33	−0.05
279	2.4	0.13	+0.01
279	2.3	0.25	+0.07
13 st.	1.8	0.14	+0.031
Mag. 3.0 — 5.0			
42	4.9	0.00	−0.01
81	3.1	0.10	+0.04
139	3.0	0.03	−0.03
143	4.9	0.24	+0.06
159	4.5	0.27	+0.03
165	4.1	0.11	+0.04
166	5.0	0.15	−0.03
301	3.5	0.23	+0.12
307	5.0	0.21	+0.01
9 st.	4.2	0.15	+0.026
Mag. 5.1 — 7.0			
74	5.2	0.10	+0.04
87	6.0	0.09	−0.09
140	6.5	0.03	−0.03
144	5.5	0.14	−0.01
151	5.9	0.33	+0.05
157	6.2	0.19	+0.01
170	5.5	0.18	−0.04
7 st.	5.8	0.15	−0.010
Mag. 7.1 — 9.0			
—	—	—	—

P. M. : 0.″41 — 0.″54			
Page	Mag.	P. M.	Par.
		″	″
Mag. 0.0 — 2.5			
90	2.5	0.53	+0.12
199	0.2	0.44	+0.08
2 st.	1.3	0.48	+0.100
Mag. 3.0 — 5.0			
69	3.1	0.51	+0.03
70	4.1	0.52	+0.08
96	3.0	0.51	−0.04
105	4.6	0.50	+0.03
172	4.8	0.54	+0.08
173	5.0	0.50	+0.01
178	3.5	0.45	−0.02
7 st.	4.0	0.50	+0.024
Mag. 5.1 — 7.0			
49	5.2	0.52	+0.01
59	7.0	0.52	+0.10
60	6.5	0.49	−0.01
68	6.0	0.54	+0.06
72	7.0	0.52	+0.00
80	6.5	0.45	+0.08
83	6.0	0.41	−0.02
283	6.4	0.52	−0.01
119	7.0	0.48	+0.08
131	6.5	0.53	+0.04
142	7.0	0.48	+0.05
145–6	5.4	0.47	+0.01
155	6.7	0.48	−0.02
311	5.1	0.45	+0.11
14 st.	6.3	0.49	+0.034
Mag. 7.1 — 9.0			
11	7.5	0.45	+0.14
20	7.8	0.45	+0.02
21	8.3	0.47	+0.05
22	8.4	0.52	+0.09
66	8.1	0.44	−0.05
77	8.2	0.48	+0.06
78	8.3	0.42	+0.04
281	7.8	0.47	−0.06
82	7.9	0.50	−0.00
84	8.3	0.49	+0.04
85	7.8	0.46	+0.03
102	8.0	0.45	+0.17
110	8.0	0.51	+0.02
111	8.7	0.52	+0.11
122	7.6	0.48	+0.04
171	7.2	0.48	−0.03
176	8.5	0.48	+0.01
299	7.8	0.53	+0.00
300	7.8	0.52	+0.04
304	8.6	0.49	+0.14
305	7.2	0.49	+0.00
309	8.1	0.49	+0.07
314	7.3	0.44	−0.02
23 st.	8.0	0.48	+0.040

P. M. : 0.″55 — 0.″65			
Page	Mag.	P. M.	Par.
		″	″
Mag. 0.0 — 2.5			
199	1.2	0.63	+0.06
199	1.0	0.65	+0.23
297	2.5	0.55	+0.05
3 st.	1.6	0.61	+0.113
Mag. 3.0 — 5.0			
43	4.2	0.55	+0.06
286	5.0	0.65	+0.09
121	3.0	0.62	+0.17
135	3.8	0.62	+0.11
179	4.2	0.56	+0.14
5 st.	4.0	0.60	+0.114
Mag. 5.1 — 7.0			
295	6.2	0.61	+0.13
29	6.1	0.62	+0.05
31	6.5	0.60	+0.02
52	6.3	0.55	+0.13
71	7.0	0.60	−0.02
103	5.5	0.63	+0.14
106	6.5	0.55	−0.02
112	6.3	0.60	+0.03
116	6.5	0.56	+0.06
133	6.0	0.56	+0.08
136	6.2	0.62	−0.03
147	7.0	0.60	+0.08
149	5.5	0.58	+0.16
152	7.0	0.55	+0.07
153	6.2	0.57	+0.11
308	6.7	0.65	+0.04
16 st.	6.3	0.59	+0.064
Mag. 7.1 — 9.0			
18	8.2	0.63	+0.07
24	7.9	0.57	+0.01
30	7.8	0.55	+0.09
35	7.3	0.60	+0.01
41	7.8	0.62	+0.07
45	8.2	0.64	+0.04
51	7.9	0.56	+0.02
56	8.0	0.57	+0.00
62	8.5	0.59	+0.08
73	7.5	0.55	+0.05
86	8.5	0.58	+0.04
92	8.0	0.59	+0.08
98	8.5	0.56	+0.02
101	8.5	0.58	−0.03
117	8.4	0.60	+0.04
132	8.5	0.58	−0.01
158	7.2	0.64	+0.05
290	8.2	0.55	−0.07
163	8.8	0.57	+0.16
167	7.4	0.56	+0.02
168	7.9	0.61	+0.03
174	7.5	0.60	+0.05
180	7.5	0.62	−0.09
23 st.	8.0	0.59	+0.032

P. M. : 0.″66 — 0.″96			
Page	Mag.	P. M.	Par.
		″	″
Mag. 0.0 — 2.5			
—	—	—	—
Mag. 3.0 — 5.0			
50	4.9	0.84	+0.11
88	3.7	0.74	+0.17
91	3.3	0.77	+0.11
93	4.5	0.78	+0.09
113	4.3	0.75	+0.09
134	3.5	0.81	+0.12
160	3.7	0.82	+0.09
175	3.8	0.73	−0.05
8 st.	4.0	0.78	+0.091
Mag. 5.1 — 7.0			
17	7.0	0.81	+0.01
26	5.3	0.82	+0.11
27–8	5.3	0.73	+0.12
48	6.5	0.68	+0.12
54	7.0	0.68	+0.05
55	5.5	0.66	+0.03
58	6.3	0.82	+0.09
64	6.7	0.82	+0.04
75	5.5	0.76	−0.02
97	6.8	0.72	−0.00
108	6.7	0.68	+0.04
115	5.7	0.82	+0.02
118	6.5	0.79	+0.00
124	6.6	0.83	+0.13
137	5.5	0.96	+0.02
138	6.1	0.66	+0.05
141	6.4	0.66	−0.06
148	6.0	0.86	+0.03
295	7.0	0.84	−0.05
183	6.3	0.77	−0.00
20 st.	6.2	0.77	+0.036
Mag. 7.1 — 9.0			
10	8.3	0.90	+0.13
12	7.5	0.79	+0.01
23	7.8	0.69	+0.07
25	7.4	0.75	+0.03
40	7.9	0.90	−0.00
47	7.1	0.73	+0.02
53	7.1	0.72	+0.07
57	8.2	0.71	+0.01
65	8.3	0.89	−0.03
67	8.2	0.69	−0.08
76	8.2	0.83	−0.06
89	7.5	0.75	−0.04
95	8.2	0.68	+0.01
100	9.0	0.92	+0.07
156	8.4	0.85	+0.05
161	7.8	0.70	−0.02
292	7.3	0.91	−0.01
177	7.3	0.67	+0.03
303	8.2	0.68	+0.09
19 st.	7.9	0.78	+0.018

P. M. : 1.″01 — 7.″07			
Page	Mag.	P. M.	Par.
		″	″
Mag. 0.0 — 2.5			
199	0.6	1.23	+0.33
236	0.0	2.29	+0.07
2 st.	0.3	1.76	+0.200
Mag. 3.0 — 5.0			
32	5.0	1.15	+0.12
39	4.3	1.25	+0.11
99	5.0	1.20	+0.12
114	3.8	1.32	+0.09
244	5.1	5.18	+0.29
255	5.0	1.84	+0.24
6 st.	4.7	1.99	+0.162
Mag. 5.1 — 7.0			
19	6.0	1.37	+0.16
33–4	6.5	2.34	+0.14
36	6.7	1.01	+0.05
123	7.0	1.66	+0.13
125	5.7	1.06	+0.14
150	7.0	1.39	+0.10
182	6.1	1.29	+0.10
254	6.5	7.07	+0.07
8 st.	6.4	2.15	+0.111
Mag. 7.1 — 9.0			
44	8.2	1.38	+0.04
46	8.5	2.19	+0.04
61	8.2	1.97	+0.08
63	7.5	1.19	+0.03
104	8.5	2.32	+0.17
107	7.7	1.08	+0.07
120	7.6	1.46	+0.00
289	8.0	1.36	+0.13
294	8.7	1.39	+0.18
259	7.3	4.77	+0.39
262	8.1	2.85	+0.31
313	7.5	1.08	+0.10
12 st.	8.0	1.92	+0.128

The means collected into a more compact table are as follows: —

Proper Motion.	0.″00 to 0.″34.		0.″41 to 0.″54.		0.″55 to 0.″65.		0.″66 to 0.″96.		1.″01 to 7.″07.	
	″		″		″		″		″	
Mag. 0.0–2.5	+0.031	13 stars	+0.100	2 stars	+0.113	3 stars	——	0 stars	+0.200	2 stars
" 3.0–5.0	+0.026	9	+0.024	7	+0.114	5	+0.091	8	+0.162	6
" 5.1–7.0	−0.010	7	+0.034	14	+0.064	16	+0.036	20	+0.111	8
" 7.1–9.0	——	0	+0.040	23	+0.032	23	+0.018	19	+0.128	12

Now while the groups are small there is, with slight exception, manifest a very decided sequence of values both with respect to magnitude and size of proper motion such as one might expect. This is very gratifying in that it shows, in our opinion, as well as does the comparison of different series upon the same stars, that on the whole the work is comparatively free from systematic error.

Transactions of the Astronomical Observatory of Yale University.

RESEARCHES WITH THE HELIOMETER.

PARALLAX INVESTIGATIONS ON 41 SOUTHERN STARS

MAINLY OF LARGE PROPER MOTION.

BY

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ACTING DIRECTOR, ASSISTANT.

CONTENTS.

		Page
§ 1.	Introduction	331
2.	Method of Observation and Reduction	332
3.	Observations and Results for 41 Southern Stars	333
4.	η Serpentis — Final Value	377
5.	B. D. +58°, 2605 — Final Value	377
6.	Discussion and Final Results	379
7.	General Conclusions	381

PARALLAX INVESTIGATIONS

ON FORTY-ONE SOUTHERN STARS MAINLY OF LARGE PROPER MOTION.

§ 1. Introduction.

With the publication of the preceding part of this volume, the Yale Observatory had covered in its investigations for parallax practically all the stars in the northern celestial hemisphere known to possess a proper motion exceeding 0″.5 a year, not previously investigated for this purpose, also the ten northern first magnitude stars, several of the second magnitude not heretofore well tested, and a considerable number of other stars interesting for different reasons. Upon the completion of this work Dr. Elkin retired from the directorship of the Observatory and Dr. Chase was appointed Acting Director. For the immediate future it seemed that with the Observatory's present equipment the most profitable course to pursue would be the extension of our parallax investigations as far as practicable into the southern heavens.

Accordingly forty-one stars were selected, thirty-six of which have an annual proper motion of some 0″.5 or greater, the remaining five being stars of the second magnitude, all of which lie in the zone between the equator and the 13th parallel of south declination. For most of these stars no determination of parallax had been published when we entered upon this investigation, although several of them are included in the recently published list of Flint.

The present work gives the observations and results for these forty-one stars together with a new and very consistent series by Mr. Smith upon the northern star B. D. +58°, 2605, for which there was an unexplained discrepancy in his previously published series.

The plan was to secure sixteen complete sets of observations for each star from the best available pair of comparison stars, that is, four, eight and four respectively, at succeeding epochs of maximum parallactic displacement. This, in the light of our previous experience, should furnish a pretty fair determination of any existing parallax. It was hoped that such a programme could be carried out and the results published within two years, but this proved a somewhat uncertain undertaking because of the difficulties involved. In the first place, it happens that for many of the stars belonging to the selected list the proper periods for observation coincide, making it at times impossible for both observers to use the instrument upon the same night. Again, the periods within which they must be observed is much more restricted than for north-

ern stars and it is often impossible to secure the observations when the parallax factor is anywhere near a maximum, on account of daylight. A protracted spell of bad weather at the critical period might easily eliminate one or more stars from the programme. The time on any given night allowable for observations is also greatly limited unless they be made at a considerable zenith distance, when the corrections for refraction become very uncertain. Finally, it was necessary to choose for comparison stars a considerable number of which are nearly, or quite as faint as the ninth magnitude, making observations impossible, or extremely difficult on nights not perfectly clear. It may also be remarked that according to previous experience such faint stars affect considerably the accuracy of CHASE's observations, although SMITH's to a less degree.

Despite these difficulties, owing to fair weather conditions at the crucial periods, we have succeeded in carrying out the programme almost to the letter, except that for the three stars Lalande 2387, Lalande 3922–3, and Weisse 2^h, 95 only six sets were secured at the middle epoch. This, however, weakens the weight of the parallax only to a slight extent.

Upon one of the stars, η Serpentis, which is a third magnitude star having a large proper motion, it was considered worth while to carry out two series with different pairs of comparison stars.

§ 2. METHOD OF OBSERVATION AND REDUCTION.

The same methods of observation and reduction have been followed as were described on pp. 6–8 of this volume. The assumed proper motion corrections in most cases have been calculated from those in right ascension and declination given by PORTER.

It is further necessary only to mention the fact that on Feb. 4, 1911, there occurred a marked change in the readings of the scales for coincidence of the images. This took place during a cleaning of the lenses which became necessary because of moisture creeping in between them, through sweating of the instrument. The moisture was removed by blowing in warm air without taking off the lenses, but in spite of all precaution taken somehow they must have been shifted in their cells. This disturbance would have a slight effect upon the resulting parallax whenever it necessitated the employment of divisions of the scales different from those before used, if these divisions should have different errors. At the time it was deemed unwise to attempt to bring the lenses back to their former position, thus causing a second disturbance, but the large number of changes in the divisions used shows that such a course would have been better. An examination of the measures shows that in the present work practically every division of "Scale B" (v. Vol. I, p. 23) from 11 to 111 and from 190 to 290 has been employed. Could we know the errors of these divisions of "Scale B" and the few of "Scale A" where a change was made after Feb. 4, 1911, it would be a comparatively simple matter either to reduce the micrometer readings made previous to that date to what they would have been had the divisions used in the subsequent observations been employed, or vice versa. But a rigid determination of these division errors has never been made and would be a difficult problem at

the present time for lack of suitable arrangements. However, from the determination of the errors for a limited portion of "Scale B," divisions 144–156, made by Hall in 1886 (v. Vol. I, pp. 112–116), one can see that the maximum difference in the errors of two consecutive divisions is about $0^R.006$, while the average is $0^R.0026$. Now, on the theory of probability, for any star where twelve different divisions of "Scale B" were used, in view of the fact that only the observations of one epoch are affected, and considering the nature of the equations of condition, the resulting parallax might be changed $0^R.003$, but that would be only for the maximum errors and when the signs conspired so as to accumulate, which would be only the most remote possibility. Indeed, if the errors be assumed to follow with equal chance in classes differing by $0^R.001$, Dr. ELKIN, to whom we are indebted for much valuable assistance in this matter, has calculated that this would happen but one time in $1/2 \times 13^4$, or once in 14,280 times; but a considerable amount of data, which we have collected, indicates that the large errors occur less frequently than supposed by this assumption, and so the chance would be even smaller. For the other extreme the errors would exactly neutralize each other and have no effect on the parallax. For the average case, on the above too generous assumption, the parallax would be changed about $0''.008$. In giving our final results we have, therefore, considered it ample allowance to include an additional error of $\pm 0''.006$, to be compounded with the probable error from the solution, as a measure of the uncertainty due to the cause above described.

§ 3. OBSERVATIONS AND RESULTS.

On the following pages are given the observations and results in the same form as for our earlier investigations (v. p. 9). Final values are deduced for η Serpentis and B. D. $+58°, 2605$ after the manner described on pages 215–216.

Weisse 1^h, 161	B. D. $-1°$, 167	Mag. 8.0	R. A. 1^h 11.2^m	Decl. $-1°$ 37′	Pos. Angle.
a	$-1°$, 162	5.8	1 7.4	−1 45	262°.7
b	$-1°$, 179	7.2	1 15.2	−1 12	67°.1

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Dec. 30	3 45	3–4	18	273.234	302.848	+0.000	−0.000	576.082
1911 Jan. 5	3 29	2–3	17.5	.204	.836	− .000	+ .000	.040
10	3 48	2	27	.224	.880	.001	.000	.103
16	3 44	3	12	.209	.855	.001	.001	.064
1911 July 10	22 44	3	75	273.270	302.862	−0.017	+0.012	576.127
14	22 32	2–3	60.5	.252	.866	.017	.012	.113
14	23 7	2–3	59.5	.257	.859	.017	.012	.111
17	22 40	3	65.5	.232	.865	.017	.012	.092
18	22 39	3	62	.246	.837	.017	.012	.078
18	23 29	3	61.5	.237	.858	.017	.012	.090
22	22 10	3–4	60.5	.265	.869	.018	.013	.129
26	22 17	3–4	57.5	.232	.871	.018	.013	.098
1912 Jan. 5	3 41	3–4	9	273.265	302.810	−0.032	+0.023	576.066
10	3 43	3	10.5	.235	.823	.033	.023	.048
13	3 22	3–4	−3	.252	.827	.033	.024	.070
19	3 56	2–3	26.5	.255	.815	.034	.024	.060
Assumed Annual Proper Motion and Mean Sum:						+0.032	−0.023	576.080

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	29.614	−0.000	29.614	$+1.0x + 1.89y - 0.01z =$	−0.021	−0.024
	.632	+ .002	.634	$1.0 \quad 1.92 \quad +0.01$	− .001	− .004
	.656	− .001	.656	$1.0 \quad 1.91 \quad 0.02$	+ .021	+ .018
	.646	+ .001	.649	$1.0 \quad 1.89 \quad 0.04$	+ .014	+ .012
C.	29.592	−0.002	29.619	$+1.0x - 1.99y + 0.52z =$	−0.016	−0.021
	.614	− .002	.641	$1.0 \quad 1.99 \quad 0.53$	+ .006	+ .001
	.602	− .002	.629	$1.0 \quad 1.99 \quad 0.53$	− .006	− .011
	.633	− .001	.661	$1.0 \quad 1.97 \quad 0.54$	+ .026	+ .021
	.591	+ .000	.620	$1.0 \quad 1.97 \quad 0.54$	− .015	− .020
	.621	− .001	.649	$1.0 \quad 1.97 \quad 0.54$	+ .014	+ .009
	.604	− .002	.633	$1.0 \quad 1.94 \quad 0.55$	− .002	− .007
	.639	− .001	.669	$1.0 \quad 1.90 \quad 0.56$	+ .034	+ .029
C.	29.545	+0.001	29.601	$+1.0x + 1.92y + 1.01z =$	−0.034	−0.026
	.588	+ .002	.646	$1.0 \quad 1.91 \quad 1.02$	+ .011	+ .020
	.575	+ .001	.633	$1.0 \quad 1.90 \quad 1.03$	− .002	+ .008
	.560	+ .001	.619	$1.0 \quad 1.87 \quad 1.05$	− .016	− .006
Assumed Mean Difference:			29.635			

Normals:

			R
+16.00 *x*	− 0.51*y*	+8.48 *z* =	+0.013
− 0.51	+59.82	−0.51 =	−0.131
+ 8.48	− 0.51	+6.55 =	−0.018

Solution:

	R	R	
x =	+0.0073	±0.0056	Wt. 5.03
y =	−0.0022	±0.0016	59.77
z =	−0.0123	±0.0088	2.06

$[nn] = 0.00520$ $[vv] = 0.00459$ Prob. Error 1 Eq. = $\pm 0''.160$

$\pi = -0''.028 \pm 0''.021$

Lalande 2387	B. D. −9°, 256	Mag. 8.5	R. A. 1h 11.7m	Decl. −9° 41′	Pos. Angle.
a	−9°, 237	8.0	1 5.2	−9 59	259°.5
b	−9°, 272	7.2	1 18.7	−9 16	75°.7

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Dec. 30	2 53	3–4	20	467.435	498.591	−0.000	+0.000	966.026
1911 Jan. 4	3 15	3	11.5	.428	.583	+ .000	− .000	.011
7	3 31	2	28.5	.441	.562	.001	.001	.003
10	3 15	2	27	.439	.547	.001	.001	965.986
1911 July 17	23 19	3	64.5	467.450	498.605	+0.015	−0.017	966.053
22	23 48	3–4	59.5	.439	.612	.015	.017	.049
26	23 52	3–4	58	.431	.602	.016	.017	.032
28	23 55	3–4	67	.406	.576	.016	.018	965.980
31	22 43	2	66.5	.444	.618	.016	.018	966.060
31	23 21	2	65.5	.438	.593	.016	.018	.029
1912 Jan. 5	2 56	3–4	8.5	467.397	498.584	+0.028	−0.031	965.978
10	3 4	3	10.5	.380	.586	.029	.032	.963
19	2 38	2–3	29	.363	.576	.029	.033	.935
19	3 16	2–3	27.5	.373	.567	.029	.033	.936
Assumed Annual Proper Motion and Mean Sum:						−0.028	+0.031	966.000

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
C.	31.156	−0.001	31.155	$+1.0\,x + 1.90\,y - 0.01\,z = +0.020$	+0.021
	.155	− .000	.155	$1.0 \quad 1.92 \quad +0.01 \quad + .020$	+ .021
	.121	− .000	.119	$1.0 \quad 1.91 \quad 0.02 \quad - .016$	− .015
	.108	+ .000	.106	$1.0 \quad 1.90 \quad 0.02 \quad - .029$	− .028
C.	31.155	−0.002	31.121	$+1.0\,x - 1.97\,y + 0.54\,z = -0.014$	−0.011
	.173	− .002	.139	$1.0 \quad 1.94 \quad 0.55 \quad + .004$	+ .007
	.171	− .001	.137	$1.0 \quad 1.89 \quad 0.56 \quad + .002$	+ .005
	.170	+ .001	.137	$1.0 \quad 1.87 \quad 0.57 \quad + .002$	+ .005
	.174	− .002	.138	$1.0 \quad 1.83 \quad 0.58 \quad + .003$	+ .006
	.155	− .001	.120	$1.0 \quad 1.83 \quad 0.58 \quad - .015$	− .012
C.	31.187	+0.001	31.129	$+1.0\,x + 1.92\,y + 1.01\,z = -0.006$	−0.011
	.206	+ .001	.146	$1.0 \quad 1.90 \quad 1.02 \quad + .011$	+ .006
	.213	+ .002	.153	$1.0 \quad 1.85 \quad 1.05 \quad + .018$	+ .013
	.194	+ .002	.134	$1.0 \quad 1.85 \quad 1.05 \quad - .001$	− .006
Assumed Mean Difference:	31.135				

Normals:

			R
$+14.00\,x$	$+ 3.82\,y$	$+7.55\,z$	$= -0.001$
$+ 3.82$	$+50.11$	$+1.46$	$= +0.062$
$+ 7.55$	$+ 1.46$	$+6.17$	$= +0.011$

Solution:

	R	R	
$x =$	−0.0036	±0.0049	Wt. 4.68
$y =$	+0.0013	±0.0015	48.90
$z =$	+0.0058	±0.0072	2.09

$[nn] = 0.00283$ $[vv] = 0.00266$ Prob. Error 1 Eq. = $\pm\overset{''}{0}.133$

$\pi = +\overset{''}{0}.016 \pm \overset{''}{0}.019$

Lalande 3922–3	B. D. −1°, 293	Mag. 7.5	R. A. 2^h 0.2^m	Decl. −1° 19′	Pos. Angle.
a	−1°, 282	8.8	1 55.8	−1 46	245°.7
b	−0°, 329	8.5	2 4.3	−0 27	50°.8

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Dec. 30	4 29	3	16	331.049	377.091	−0.000	+0.000	708.140
1911 Jan. 4	4 15	3	11	.027	.064	+ .000	− .000	.091
5	4 10	2–3	17	.054	.094	.000	.000	.148
7	4 14	2	27	.046	.098	.001	.001	.144
1911 July 22	23 3	3–4	60	331.041	377.121	+0.019	−0.021	708.160
25	22 55	2	55.5	330.983	.126	.020	.021	.108
25	23 33	2	55	331.006	.114	.020	.021	.119
28	22 57	3–4	67	.024	.111	.020	.022	.133
30	22 56	1–2	65.5	.018	.118	.020	.022	.134
31	0 2	2	64.5	.031	.111	.020	.022	.140
1912 Jan. 10	4 27	3	11.5	331.008	377.120	+0.036	−0.039	708.125
23	4 21	3	38.5	.003	.134	.037	.040	.134
24	3 59	2	20	.006	.120	.037	.040	.123
24	4 33	2	19.5	.008	.137	.037	.040	.142
Assumed Annual Proper Motion and Mean Sum:						−0.035	+0.038	708.130

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
C.	46.042	−0.001	46.041	$+1.0\,x + 1.83\,y - 0.01\,z = -0.004$	−0.001
	.037	+ .003	.040	$1.0 \quad 1.88 \quad +0.01 \quad - .005$	− .002
	.040	− .001	.039	$1.0 \quad 1.89 \quad 0.01 \quad - .006$	− .003
	.052	− .001	.049	$1.0 \quad 1.89 \quad 0.02 \quad + .004$	+ .007
C.	46.080	−0.002	64.038	$+1.0\,x - 1.98\,y + 0.55\,z = -0.007$	−0.020
	.143	+ .001	.103	$1.0 \quad 1.97 \quad 0.56 \quad + .058$	+ .045
	.108	+ .001	.068	$1.0 \quad 1.97 \quad 0.56 \quad + .023$	+ .010
	.087	− .000	.045	$1.0 \quad 1.95 \quad 0.57 \quad + .000$	− .013
	.100	− .000	.058	$1.0 \quad 1.94 \quad 0.57 \quad + .013$	− .000
	.080	− .001	.037	$1.0 \quad 1.93 \quad 0.58 \quad - .008$	− .021
C.	46.112	+0.000	46.037	$+1.0\,x + 1.90\,y + 1.02\,z = -0.008$	−0.008
	.131	− .000	.054	$1.0 \quad 1.90 \quad 1.06 \quad + .009$	+ .009
	.114	+ .000	.037	$1.0 \quad 1.89 \quad 1.06 \quad - .008$	− .008
	.129	− .001	.051	$1.0 \quad 1.89 \quad 1.06 \quad + .006$	+ .006
Assumed Mean Difference:			46.045		

Normals: (R)

$+14.00\,x + 3.33\,y + 7.62\,z = +0.067$

$+3.33 \quad +51.34 \quad +1.38 \quad = -0.178$

$+7.62 \quad +1.38 \quad +6.33 \quad = +0.044$

Solution:

	R	R	
x =	+0.0043	±0.0054	Wt. 4.78
y =	−0.0038	±0.0017	50.46
z =	+0.0025	±0.0080	2.18

$[nn] = 0.00451 \quad [vv] = 0.00344$ Prob. Error 1 Eq. = ±0.″151

$\pi = -0.''048 \pm 0.''021$

Weisse 2^h, 95	B. D. $-1°$, 306	Mag. 8.3	R. A. 2^h 7.1^m	Decl. $-1°$ 52′	Pos. Angle.
a	$-2°$, 374	8.9	2 4.0	−2 15	244°.9
b	$-1°$, 312	8.8	2 10.5	−1 39	76°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1911 Jan. 10	4 29	2	27.5	251.421	241.386	−0.001	+0.001	492.807
16	4 29	3	11	.415	.392	.003	.003	.807
18	4 12	2–3	16.5	.431	.370	.003	.004	.802
18	4 42	2–3	16.5	.458	.376	.003	.004	.835
1911 July 26	23 9	3–4	58	251.474	241.373	−0.038	+0.041	492.850
Aug. 4	22 49	2	60.5	.477	.380	.040	.043	.860
4	23 24	2	60.5	.490	.351	.040	.043	.844
4	23 55	2	60	.511	.360	.040	.043	.874
5	23 2	3–4	62.5	.502	.348	.040	.043	.853
5	0 0	3–4	63.5	.514	.349	.040	.043	.866
1912 Jan. 27	4 17	3–4	11.5	251.529	241.314	−0.072	+0.078	492.849
27	4 54	3–4	10.5	.497	.293	.072	.078	.796
Feb. 1	4 34	3–4	21.5	.501	.307	.072	.079	.815
3	3 29	2–3	17.5	.496	.300	.073	.080	.803
Assumed Annual Proper Motion and Mean Sum:						+0.067	−0.073	492.840

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
C.	10.035	+0.001	10.034	$+1.0x - 1.92y + 0.02z = -0.016$	−0.011
	.023	+ .001	.018	$1.0 \quad 1.94 \quad 0.04 \quad - .032$	− .027
	.061	+ .001	.055	$1.0 \quad 1.94 \quad 0.05 \quad + .005$	+ .010
	.082	+ .000	.075	$1.0 \quad 1.94 \quad 0.05 \quad + .025$	+ .030
C.	10.101	−0.000	10.022	$+1.0x + 2.01y + 0.56z = -0.028$	−0.030
	.097	− .000	.014	$1.0 \quad 1.96 \quad 0.59 \quad - .036$	− .038
	.139	− .000	.056	$1.0 \quad 1.96 \quad 0.59 \quad + .006$	+ .004
	.151	− .001	.068	$1.0 \quad 1.96 \quad 0.59 \quad + .018$	+ .016
	.154	− .000	.071	$1.0 \quad 1.95 \quad 0.59 \quad + .021$	+ .019
	.165	− .001	.081	$1.0 \quad 1.95 \quad 0.59 \quad + .031$	+ .029
C.	10.215	−0.000	10.065	$+1.0x - 1.91y + 1.07z = +0.015$	+0.013
	.204	+ .001	.055	$1.0 \quad 1.91 \quad 1.07 \quad + .005$	+ .003
	.194	+ .001	.044	$1.0 \quad 1.88 \quad 1.08 \quad - .006$	− .008
	.196	+ .001	.044	$1.0 \quad 1.87 \quad 1.09 \quad - .006$	− .008
Assumed Mean Difference:	10.050				

Normals: (R)

$+14.00x - 3.52y + 7.98z = +0.002$

$- 3.52 + 52.45 - 1.56 = +0.040$

$+ 7.98 - 1.56 + 6.70 = +0.016$

Solution:

	R	R	
$x =$	−0.0035	±0.0074	Wt. 4.45
$y =$	+0.0007	±0.0022	51.48
$z =$	+0.0067	±0.0106	2.15

$[nn] = 0.00609 \quad [vv] = 0.00596$ Prob. Error 1 Eq. = ±0″.197

$\pi = +0''.008 \pm 0''.027$

Lalande 6320	B. D. −5°, 642	Mag. 7.9	R. A. 3h 17.9m	Decl. −5° 51′	Pos. Angle.
a	−6°, 643	8.8	3 10.7	−6 27	251°.8
b	−4°, 609	7.8	3 23.4	−4 47	52°.3

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Aug. 19	0 59	2	56	530.798	501.545	−0.015	+0.021	1032.349
20	0 57	3	58	.798	.574	.015	.021	.378
21	0 46	2	60.5	.770	.528	.014	.020	.304
26	0 56	3–4	51	.800	.588	.014	.020	.394
1911 Jan. 10	5 29	3	28.5	530.764	501.596	+0.001	−0.002	1032.359
12	4 15	3	33	.754	.575	.001	.002	.328
12	4 49	3	33	.758	.582	.001	.002	.339
15	5 12	3	24.5	.746	.558	.002	.002	.304
16	5 16	2–3	10.5	.762	.590	.002	.002	.352
16	5 42	2–3	10.5	.759	.591	.002	.002	.350
17	4 46	2–3	14.5	.759	.586	.002	.003	.344
17	5 16	2–3	14.5	.760	.572	.002	.003	.331
1911 Aug. 10	0 44	2–3	68.5	530.749	501.610	+0.024	−0.034	1032.349
10	1 22	2–3	68.5	.760	.619	.024	.034	.369
14	0 58	2–3	65	.753	.607	.025	.035	.350
14	1 27	2–3	64	.772	.634	.025	.035	.396
Assumed Annual Proper Motion and Mean Sum:						−0.040	+0.056	1032.350

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
S.	29.253	+0.000	29.217	+1.0 *x* +1.88 *y* −0.37 *z* = +0.027	+0.019
	.224	− .001	.187	1.0 1.87 0.37 − .003	− .011
	.242	+ .001	.209	1.0 1.86 0.36 + .019	+ .011
	.212	− .001	.177	1.0 1.80 0.35 − .013	− .021
S.	29.168	−0.000	29.171	+1.0 *x* −1.73 *y* +0.03 *z* = −0.019	−0.010
	.179	+ .001	.183	1.0 1.75 0.03 − .007	+ .002
	.176	+ .000	.179	1.0 1.75 0.03 − .011	− .002
	.188	+ .001	.193	1.0 1.79 0.04 + .003	+ .012
	.172	− .000	.176	1.0 1.80 0.04 − .014	− .005
	.168	+ .000	.172	1.0 1.80 0.04 − .018	− .009
	.173	+ .000	.178	1.0 1.81 0.05 − .012	− .003
	.188	+ .001	.194	1.0 1.81 0.05 + .004	+ .013
S.	29.139	+0.000	29.197	+1.0 *x* +1.94 *y* +0.61 *z* = +0.007	−0.002
	.141	− .001	.198	1.0 1.94 0.61 + .008	− .001
	.146	+ .000	.206	1.0 1.92 0.62 + .016	+ .007
	.138	− .001	.197	1.0 1.92 0.62 + .007	− .002
Assumed Mean Difference:			29.190		

Normals:

			R
+16.00 *x*	+ 0.89 *y*	+1.32 *z*	= −0.006
+ 0.89	+53.94	+1.51	= +0.262
+ 1.32	+ 1.51	+2.03	= +0.008

Solution:

	R	R	
x =	−0.0007	±0.0019	Wt. 15.1
y =	+0.0048	±0.0010	52.8
z =	+0.0007	±0.0055	1.9

$[nn] = 0.00291$ $[vv] = 0.00164$ Prob. Error 1 Eq. = ±0″.096

$\pi = +0''.061 \pm 0''.013$

ϵ Eridani	**B. D. − 9°, 697**	**Mag. 3.3**	**R. A. 3h 26.1m**	**Decl. −9° 57′**	**Pos. Angle.**
a	−10°, 679	8.4	3 19.7	−10 2	267°.3
b	− 9°, 717	8.9	3 32.3	− 9 28	72°.8

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections R	P. M. Corrections R	Corrected Sum. R
1910	Aug. 20	1 58	3	56	440.615	458.821	−0.028	+0.027	899.435
	27	1 22	2–3	55	.557	.776	.027	.026	.332
	29	1 23	2–3	57.5	.611	.814	.026	.025	.424
	Sept. 2	1 25	3	55.5	.596	.783	.025	.024	.378
1911	Jan. 23	5 1	2	23.5	440.492	458.854	+0.005	−0.004	899.347
	24	4 40	2	30.5	.516	.866	.005	.005	.382
	30	4 38	2–3	23	.505	.857	.006	.006	.362
	Feb. 5	4 28	2	21	.517	.878	.008	.007	.396
	11	4 43	1–2	27.5	.496	.858	.008	.008	.354
	11	5 16	1–2	27.5	.503	.867	.008	.008	.370
	15	5 5	2–3	14	.498	.852	.010	.010	.350
	16	4 52	2	26	.498	.848	.010	.010	.346
1911	Aug. 18	1 53	3	56	440.532	458.871	+0.049	−0.047	899.405
	19	1 29	3	56	.557	.892	.049	.047	.451
	19	1 50	3	56	.547	.886	.049	.047	.435
	20	1 20	2	56.5	.530	.864	.049	.047	.396
	Assumed Annual Proper Motion and Mean Sum:						−0.077	+0.074	899.385

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	18.206	−0.000	18.261	+1.0 *x*	−1.98 *y*	−0.37 *z*	= −0.034	+0.006
	.219	+ .001	.273	1.0	1.93	0.35	− .022	+ .017
	.203	− .001	.253	1.0	1.91	0.34	− .042	− .003
	.187	+ .000	.236	1.0	1.85	0.33	− .059	− .022
S.	18.362	+0.001	18.354	+1.0 *x*	+1.85 *y*	+0.06 *z*	= +0.059	+0.013
	.350	+ .000	.340	1.0	1.86	0.07	+ .045	− .001
	.352	+ .000	.340	1.0	1.92	0.08	+ .045	− .003
	.361	− .000	.346	1.0	1.95	0.10	+ .051	+ .003
	.362	+ .001	.347	1.0	1.95	0.11	+ .052	+ .004
	.364	+ .000	.348	1.0	1.95	0.11	+ .053	+ .005
	.354	+ .001	.335	1.0	1.93	0.13	+ .040	− .007
	.350	+ .001	.331	1.0	1.93	0.13	+ .036	− .011
S.	18.339	−0.000	18.243	+1.0 *x*	−1.99 *y*	+0.63 *z*	= −0.052	+0.003
	.335	− .001	.238	1.0	1.98	0.63	− .057	− .003
	.339	− .001	.242	1.0	1.98	0.63	− .053	+ .002
	.334	− .000	.238	1.0	1.98	0.63	− .057	− .003
	Assumed Mean Difference:		18.295					

Normals: (R)

$+16.00\,x - 0.26\,y + 1.92\,z = +0.005$

$-0.26 + 59.84\,y - 0.83\,z = +1.460$

$+1.92 - 0.83\,y + 2.17\,z = -0.046$

Solution: (R)

$x = +0.0025 \pm 0.0017$ Wt. 14.3

$y = +0.0242 \pm 0.0008$ 59.5

$z = -0.0149 \pm 0.0047$ 1.9

$[nn] = 0.03744$ $[vv] = 0.00123$ Prob. Error 1 Eq. = $\pm 0''.083$

$\pi = +0''.307 \pm 0''.010$

Weisse 3^h, 617	B. D. $-3°$, 592	Mag. 7.2	R. A. 3^h 33.0^m	Decl. $-3°$ 41′	Pos. Angle.
a	$-4°$, 622	8.0	3 26.3	−4 29	244°.6
b	$-3°$, 612	9.0	3 40.0	−3 45	92°.3

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Aug. 19	1 32	2	56	524.640	494.882	+0.017	−0.022	1019.517
20	1 24	3	57	.655	.861	.017	.022	.511
21	1 13	2	60	.644	.847	.016	.021	.486
26	1 26	3–4	51	.656	.876	.016	.021	.527
1911 Jan. 23	5 42	2	23	524.642	494.802	−0.003	+0.004	1019.445
24	5 8	2	30	.667	.822	.003	.004	.490
30	5 13	2–3	22.5	.701	.854	.004	.005	.556
Feb. 5	4 55	1–2	20	.681	.834	.005	.006	.516
10	5 16	2	27.5	.697	.853	.005	.006	.551
11	5 43	1–2	27	.652	.792	.005	.006	.445
15	5 41	2–3	13	.686	.830	.006	.008	.518
16	5 19	2	25.5	.662	.813	.006	.008	.477
1911 Aug. 15	1 5	3–4	64.5	524.728	494.857	−0.028	+0.037	1019.594
15	1 36	3–4	64.5	.738	.854	.028	.037	.601
18	1 2	3	56.5	.709	.833	.028	.037	.551
18	1 27	3	56	.698	.833	.028	.037	.540
Assumed Annual Proper Motion and Mean Sum:						+0.045	−0.059	1019.520

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	29.758	+0.000	29.797	$+1.0\,x + 1.94\,y - 0.37\,z =$	−0.029	−0.024
	.794	+ .000	.833	1.0 1.94 0.37	+ .007	+ .012
	.797	+ .001	.835	1.0 1.93 0.36	+ .009	+ .014
	.780	− .000	.817	1.0 1.91 0.35	− .009	− .004
S.	29.840	+0.002	29.835	$+1.0\,x - 1.79\,y + 0.06\,z =$	+0.009	−0.003
	.845	+ .001	.839	1.0 1.81 0.07	+ .013	+ .001
	.847	− .001	.837	1.0 1.87 0.08	+ .011	− .002
	.847	+ .000	.836	1.0 1.92 0.10	+ .010	− .003
	.844	− .001	.832	1.0 1.93 0.11	+ .006	− .007
	.860	+ .002	.851	1.0 1.93 0.11	+ .025	+ .012
	.856	+ .000	.842	1.0 1.90 0.13	+ .016	+ .004
	.849	+ .001	.836	1.0 1.89 0.13	+ .010	− .002
S.	29.871	−0.002	29.804	$+1.0\,x + 1.95\,y + 0.62\,z =$	−0.022	−0.003
	.884	− .002	.817	1.0 1.95 0.62	− .009	+ .010
	.876	− .001	.810	1.0 1.95 0.63	− .016	+ .003
	.865	− .001	.799	1.0 1.95 0.63	− .027	− .008
Assumed Mean Difference:			29.826			

Normals:

			R
+16.00 *x*	+ 0.48 *y*	+1.84 *z* =	+0.004
+ 0.48	+58.38	+0.58 =	−0.376
+ 1.84	+ 0.58	+2.17 =	+0.430

Solution:

	R	R	
x =	+0.0020	±0.0018	Wt. 14.4
y =	−0.0063	±0.0009	58.2
z =	−0.0134	±0.0050	2.0

$[nn] = 0.00409$ $[vv] = 0.00135$ Prob. Error 1 Eq. = ±0.087

$\pi = -0.080 \pm 0.011$

δ Eridani	B. D. −10°, 728	Mag. 3.3	R. A. $3^h\ 36.3^m$	Decl. −10° 15′	Pos. Angle.
a	−10°, 708	8.6	3 29.0	−10 40	256°.8
b	−10°, 759	8.2	3 44.1	−10 10	88°.2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910	Aug.	21	1 49	2	59.5	525.799	544.203	+0.001	+0.003	1070.006
		27	2 0	3–4	53.5	.843	.238	.001	.002	.084
		29	1 53	3–4	57	.848	.236	.001	.002	.087
	Sept.	2	2 11	3	55.5	.824	.216	.001	.002	.043
1911	Jan.	23	4 17	2	24	525.774	544.236	−0.000	−0.000	1070.010
		24	4 1	2	31	.823	.272	.000	.000	.095
		25	4 16	2	33	.810	260	.000	.000	.070
		28	4 42	3–4	35.5	.805	.258	.000	.001	.062
		30	4 3	2–3	23.5	.830	.281	.000	.001	.110
	Feb.	5	3 55	2	22	.838	.288	.000	.001	.125
		10	4 46	2	28	.832	.290	.000	.001	.121
		11	4 15	1–2	28	.815	.257	.000	.001	.071
1911	Aug.	21	1 48	2	58.5	525.879	544.256	−0.003	−0.005	1070.127
		22	1 48	2	59.5	.862	.273	.003	.005	.127
		22	2 10	2	59	.858	.259	.003	.005	.109
	Sept.	1	2 0	1–2	62.5	.853	.261	.003	.005	.106
						Assumed Annual Proper Motion and Mean Sum:		+0.004	+0.007	1070.085

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S	18.404	+0.001	18.407	+1.0 *x*	−1.98 *y*	−0.36 *z*	= −0.017	+0.011
	.395	+ .000	.396	1.0	1.95	0.35	− .028	− .001
	.388	− .000	.389	1.0	1.93	0.34	− .035	− .008
	.392	+ .001	.394	1.0	1.90	0.33	− .030	− .003
S.	18.462	+0.001	18.463	+1.0 *x*	+1.82 *y*	+0.06 *z*	= +0.039	+0.013
	.449	− .000	.449	1.0	1.83	0.07	+ .025	− .001
	.450	+ .000	.450	1.0	1.84	0.07	+ .026	− .000
	.453	+ .000	.452	1.0	1.87	0.08	+ .028	+ .001
	.451	− .000	.450	1.0	1.89	0.08	+ .026	− .001
	.450	− .001	.448	1.0	1.93	0.10	+ .024	− .004
	.458	− .001	.456	1.0	1.94	0.11	+ .032	+ .004
	.442	+ .000	.441	1.0	1.94	0.11	+ .017	− .011
S.	18.377	−0.001	18.374	+1.0 *x*	−1.98 *y*	+0.64 *z*	= −0.050	−0.022
	.411	− .001	.408	1.0	1.98	0.64	− .016	+ .012
	.401	− .000	.399	1.0	1.98	0.64	− .025	+ .003
	.408	− .000	.406	1.0	1.90	0.67	− .018	+ .009
	Assumed Mean Difference:		18.424					

Normals: +16.00 *x* − 0.54 *y* +1.89 *z* = −0.002 R
− 0.54 +58.78 −1.12 = +0.834
+ 1.89 − 1.12 +2.22 = −0.015

Solution: *x* = +0.0003 ±0.0017 R — Wt. 14.4
y = +0.0142 ±0.0008 R — 58.2
z = +0.0000 ±0.0046 R — 2.0

$[nn] = 0.01307$ $[vv] = 0.00122$ Prob. Error 1 Eq. = ±0.″083

$\pi = +0.''181 \pm 0.''010$

Weisse	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
4^h, 1189	$-5°$, 1123	6.3	4^h 53.7^m	$-5°$ 56′	
a	$-6°$, 1024	8.0	4 48.5	−6 20	253°.1
b	$-5°$, 1156	8.0	4 59.8	−5 21	69°.4

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R		Corrected Sum. R
1910	Aug.	29	2 26	3–4	56.5	382.341	463.192	+0.006	−0.004	845.535
	Sept.	2	3 5	3–4	53.5	.334	.185	.006	.004	.521
		5	2 30	3	71	.349	.202	.006	.004	.553
		6	2 34	3	69.5	.335	.203	.006	.004	.540
1911	Feb.	2	6 17	2	14	382.325	463.202	−0.002	+0.001	845.526
		5	7 18	2	16	.326	.192	.002	.001	.517
		10	6 55	2	26	.322	.185	.002	.001	.506
		16	5 50	2	25	.314	.181	.002	.002	.495
		18	5 41	2	25.5	.313	.174	.002	.002	.487
		19	6 8	2	22.5	.302	.164	.003	.002	.465
		21	5 57	3–4	14.5	.300	.163	.003	.002	.462
		22	5 14	2–3	28.5	.313	.180	.003	.002	.492
1911	Sept.	1	2 52	1–2	61	382.360	463.190	−0.013	+0.008	845.545
		1	3 10	1–2	61	.353	.171	.013	.008	.519
		2	2 33	2	67	.381	.198	.013	.008	.574
		2	2 58	2	67	.396	.197	.013	.008	.588
							Assumed Annual Proper Motion and Mean Sum:	+0.019	−0.012	845.514

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	80.851	−0.002	80.839	+1.0 *x*	−1.98 *y*	−0.34 *z*	= −0.017	−0.004
	.851	− .001	.840	1.0	1.97	0.33	− .016	− .004
	.853	− .004	.839	1.0	1.96	0.32	− .017	− .005
	.868	− .002	.856	1.0	1.96	0.32	− .000	+ .012
S.	80.877	−0.001	80.879	+1.0 *x*	+1.78 *y*	+0.09 *z*	= +0.023	+0.008
	.866	− .000	.869	1.0	1.82	0.10	+ .013	− .002
	.863	+ .001	.867	1.0	1.87	0.11	+ .011	− .005
	.867	+ .002	.873	1.0	1.91	0.13	+ .017	+ .001
	.861	+ .003	.868	1.0	1.92	0.13	+ .012	− .004
	.862	+ .005	.872	1.0	1.92	0.14	+ .016	+ .000
	.863	+ .005	.873	1.0	1.93	0.14	+ .017	+ .001
	.867	+ .002	.874	1.0	1.93	0.14	+ .018	+ .002
S.	80.830	+0.007	80.858	+1.0 *x*	−1.98 *y*	+0.67 *z*	= +0.002	+0.022
	.818	− .000	.839	1.0	1.98	0.67	− .017	+ .003
	.817	− .006	.832	1.0	1.97	0.67	− .024	− .004
	.801	− .007	.815	1.0	1.97	0.67	− .041	− .021
	Assumed Mean Difference:		80.856					

Normals: (R)

$+16.00\,x - 0.69\,y + 2.35\,z = -0.003$

$-0.69\,x + 59.53\,y - 0.86\,z = +0.495$

$+2.35\,x - 0.86\,y + 2.35\,z = -0.022$

Solution:

	R	R	
x =	+0.0013	±0.0018	Wt. 13.6
y =	+0.0082	±0.0009	59.2
z =	−0.0075	±0.0047	2.0

$[nn] = 0.00550$ $[vv] = 0.00126$ Prob. Error 1 Eq. = $\pm 0''.084$

$\pi = +0''.104 \pm 0''.011$

Lalande 9960–1	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	−3°, 1061	8.5	5h 11.9m	−3° 14′	
b	−3°, 1042	7.7	5 6.4	−3 48	247°.8
	−2°, 1241	8.0	5 17.7	−2 57	79°.4

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Sept.	5	3 1	2–3	70	418.708	423.299	+0.018	−0.019	842.006
	6	3 6	3	69	.684	.275	.018	.019	841.958
	7	2 47	2	59.5	.672	.268	.018	.019	.939
	8	3 25	2–3	62.5	.682	.266	.017	.018	.947
1911 Feb.	5	7 51	2	15.5	418.682	423.240	−0.010	+0.010	841.922
	10	5 58	2–3	28	.671	.226	.011	.011	.897
	10	6 25	2–3	27	.672	.225	.011	.011	.897
	22	6 25	2	24.5	.666	.208	.012	.013	.875
	23	5 43	2	24.5	.666	.224	.012	.013	.891
	23	6 6	2	24.5	.674	.210	.012	.013	.885
	24	5 58	2	29	.670	.224	.013	.013	.894
	24	6 31	2	28.5	.658	.210	.013	.013	.868
1911 Sept.	3	2 36	3–4	55	418.742	423.215	−0.038	+0.039	841.958
	3	2 57	3–4	55	.709	.207	.038	.039	.917
	4	2 33	3–4	54.5	.720	.197	.038	.039	.918
	4	2 55	3–4	54.5	.714	.177	.038	.039	.892
Assumed Annual Proper Motion and Mean Sum:							+0.056	−0.058	841.916

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	4.591	−0.000	4.554	+1.0 *x*	−1.95 *y*	−0.32 *z*	=	−0.010	+0.000
	.591	− .000	.554	1.0	1.95	0.32		− .010	+ .000
	.596	− .000	.559	1.0	1.95	0.32		− .005	+ .005
	.584	− .000	.549	1.0	1.95	0.31		− .015	− .005
S.	4.558	−0.000	4.578	+1.0 *x*	+1.74 *y*	+0.18 *z*	=	+0.014	+0.004
	.555	+ .000	.577	1.0	1.80	0.19		+ .013	+ .003
	.553	+ .000	.575	1.0	1.80	0.19		+ .011	+ .001
	.542	+ .000	.567	1.0	1.91	0.22		+ .003	− .008
	.558	+ .000	.583	1.0	1.92	0.22		+ .019	+ .008
	.536	+ .000	.561	1.0	1.92	0.22		− .003	− .014
	.554	+ .000	.580	1.0	1.92	0.23		+ .016	+ .005
	.552	+ .000	.578	1.0	1.92	0.23		+ 0.14	+ .003
S.	4.473	−0.000	4.550	+1.0 *x*	−1.95 *y*	+0.67 *z*	=	−0.014	−0.005
	.498	− .000	.575	1.0	1.95	0.67		+ .011	+ .020
	.477	− .000	.554	1.0	1.95	0.68		− .010	− .001
	.463	+ .000	.540	1.0	1.95	0.68		− .024	− .015
Assumed Mean Difference:			4.564						

Normals:

			R
+16.00 *x*	− 0.67 *y*	+3.11 *z*	= +0.010
− 0.67	+58.32	+0.31	= +0.312
+ 3.11	+ 0.31	+2.58	= +0.006

Solution:

	R	R	
x =	+0.0005	±0.0018	Wt. 12.2
y =	+0.0053	±0.0008	58.2
z =	+0.0009	±0.0044	2.0

$[nn] = 0.00276$ $[vv] = 0.00108$ Prob. Error 1 Eq. = $\pm 0''.078$

$\pi = +0''.067 \pm 0''.010$

Lalande 10299	B. D. −3°, 1110	Mag. 8.5	R. A. $5^h\ 21.3^m$	Decl. −3° 36′	Pos. Angle.
a	−3°, 1075	8.0	5 14.7	−3 6	287°.0
b	−3°, 1146	7.0	5 28.4	−3 21	82°.0

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910	Sept.	24	3 16	2	58.5	482.974	509.489	−0.000	+0.008	992.471
		24	3 49	2	58.5	.983	.497	.000	.008	.488
		28	2 49	3	52	.972	.489	.000	.008	.469
		28	3 21	3	51	.961	.481	.000	.008	.450
1911	Feb.	25	5 37	2	38	482.958	509.514	+0.000	−0.005	992.467
		27	5 39	3–4	33	.974	.529	.000	.005	.498
		28	5 47	2–3	20.5	.978	.529	.000	.005	.502
	Mar.	1	6 29	2	30.5	.952	.516	.000	.005	.463
		4	6 40	2	25.5	.959	.515	.000	.005	.469
		5	6 16	1–2	23.5	.947	.500	.000	.006	.441
		6	6 19	1–2	26	.939	.491	.000	.006	.424
		8	6 28	1–2	30.5	.950	.514	.000	.006	.458
1911	Sept.	16	3 17	2–3	58.5	482.972	509.505	+0.001	−0.022	992.456
		17	2 54	3–4	43.5	.963	.523	.001	.022	.465
		19	2 36	2–3	44.5	.961	.518	.001	.022	.458
		22	3 41	2–3	55.5	.974	.507	.001	.022	.460
Assumed Annual Proper Motion and Mean Sum:								−0.001	+0.031	992.464

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	26.515	−0.000	26.523	$+1.0\,x - 1.90\,y - 0.27\,z =$	−0.017	−0.001
	.514	− .001	.521	1.0 1.90 0.27	− .019	− .003
	.517	− .000	.525	1.0 1.88 0.26	− .015	+ .001
	.520	+ .000	.528	1.0 1.88 0.26	− .012	+ .004
S.	26.556	−0.000	26.551	$+1.0\,x + 1.82\,y + 0.15\,z =$	+0.011	+0.000
	.555	− .001	.549	1.0 1.83 0.16	+ .009	− .002
	.551	− .001	.545	1.0 1.84 0.16	+ .005	− .006
	.564	+ .000	.559	1.0 1.85 0.16	+ .019	+ .008
	.556	− .000	.551	1.0 1.87 0.17	+ .011	− .000
	.553	+ .001	.548	1.0 1.87 0.18	+ .008	− .003
	.552	+ .001	.547	1.0 1.88 0.18	+ .007	− .004
	.564	+ .000	.558	1.0 1.89 0.18	+ .018	+ .007
S.	26.533	+0.000	26.510	$+1.0\,x - 1.93\,y + 0.71\,z =$	−0.030	−0.013
	.560	− .000	.537	1.0 1.92 0.71	− .003	+ .014
	.557	+ .000	.534	1.0 1.92 0.71	− .006	+ .011
	.533	+ .000	.510	1.0 1.91 0.72	− .030	− .013
Assumed Mean Difference:			26.540			

Normals:

			R
+16.00 *x*	− 0.39 *y*	+3.13 *z*	= −0.044
− 0.39	+56.60	−0.98	= +0.415
+ 3.13	− 0.98	+2.54	= −0.018

Solution:

	R	R	
x =	−0.0023	±0.0016	Wt. 12.1
y =	+0.0073	±0.0007	56.2
z =	−0.0015	±0.0040	1.9

$[nn] = 0.00401$ $[vv] = 0.00085$ Prob. Error 1 Eq. = ±0″.070

π = +0″.093 ±0″.009

δ Orionis	B. D. −0°, 983	Mag. Var.	R. A. 5^h 24.6^m	Decl. −0° 25′	Pos. Angle.
a	−0°, 945	7.3	5 18.1	−0 41	261°.0
b	−0°, 1034	8.2	5 30.7	−0 16	85°.2

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Oct.	5	2 48	1–2	67	465.712	434.304	0.000	0.000	900.016
		5	3 15	1–2	67	.700	.300	.000	.000	.000
		9	2 56	3–4	49.5	.708	.330	.000	.000	.038
		10	2 27	3–4	43.5	.733	.332	.000	.000	.065
1911	Feb.	25	6 13	2	37	465.712	434.284	0.000	0.000	899.996
		27	6 16	3–4	32	.739	.300	.000	.000	900.039
		28	6 22	2–3	20.5	.724	.290	.000	.000	.014
	Mar.	1	6 59	2	29.5	.692	.271	.000	.000	899.963
		4	7 13	2	25.5	.712	.275	.000	.000	.987
		5	6 50	1–2	23.5	.700	.279	.000	.000	.979
		6	6 42	1–2	26	.713	.274	.000	000	.987
		7	6 57	1–2	29.5	.706	.280	.000	.000	.986
1911	Sept.	3	3 17	3	55	465.719	434.284	0.000	0.000	900.003
		4	3 21	3–4	62.5	.725	.293	.000	.000	.018
		13	2 29	3	38.5	.732	.307	.000	.000	.039
		13	2 58	3	37.5	.708	.302	.000	.000	.010
						Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	900.009

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	31.408	−0.000	31.408	+1.0 *x*	+1.81 *y*	−0.24 *z*	= −0.013	+0.012
	.400	+ .000	.400	1.0	1.81	0.24	− .021	+ .004
	.378	− .001	.377	1.0	1.76	0.23	− .044	− .019
	.401	− .002	.399	1.0	1.74	0.23	− .022	+ .003
S.	31.428	+0.000	31.428	+1.0 *x*	−1.92 *y*	+0.15 *z*	= +0.007	−0.002
	.439	− .001	.438	1.0	1.93	0.16	+ .017	+ .007
	.434	− .000	.434	1.0	1.94	0.16	+ .013	+ .003
	.421	+ .002	.423	1.0	1.95	0.16	+ .002	− .008
	.437	+ .001	.438	1.0	1.95	0.17	+ .017	+ .007
	.421	+ .001	.422	1.0	1.96	0.18	+ .001	− .010
	.439	+ .001	.440	1.0	1.96	0.18	+ .019	+ .008
	.426	+ .001	.427	1.0	1.96	0.18	+ .006	− .005
S.	31.435	+0.000	31.435	+1.0 *x*	+1.99 *y*	+0.67 *z*	= +0.014	+0.011
	.432	− .000	.432	1.0	2.00	0.68	+ .011	+ .008
	.425	− .001	.424	1.0	1.99	0.70	+ .003	− .001
	.406	− .000	.406	1.0	1.99	0.70	− .015	− .019
	Assumed Mean Difference:		31.421					

Normals:

			R
+16.00 *x*	− 0.48 *y*	+3.15 *z*	= −0.005
− 0.48	+58.86	+1.21	= −0.311
+ 3.15	+ 1.21	+2.33	= +0.046

Solution:

	R	R	
x =	−0.0068	±0.0021	Wt. 11.7
y =	−0.0060	±0.0009	57.9
z =	+0.0322	±0.0055	1.7

$[nn] = 0.00478$ $[vv] = 0.00146$ Prob. Error 1 Eq. = ±″0.091

$\pi = -″0.076 \pm ″0.010$

ϵ Orionis	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	−1°, 943	7.4	5h 26.2m	−1° 15′	273°.4
b	−1°, 990	8.4	5h 31.6m	−1° 14′	86°.8

Date.	Sid. Time. h. m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Oct. 5	3 58	2–3	64.5	191.283	192.163	0.000	0.000	383.446
9	3 36	3	49	.296	.172	.000	.000	.468
10	4 10	3–4	42.5	.298	.182	.000	.000	.480
11	4 0	2–3	52	.301	.188	.000	.000	.489
1911 Feb. 21	8 16	3–4	10	191.312	192.171	0.000	0.000	383.483
22	7 12	2–3	23.5	.304	.167	.000	.000	.471
22	7 47	2–3	22	.292	.189	.000	.000	.481
23	7 35	3	23.5	.294	.167	.000	.000	.461
23	8 12	3	22.5	.287	.177	.000	.000	.464
27	7 0	2	30	.305	.196	.000	.000	.501
27	7 39	2	29	.300	.185	.000	.000	.485
28	8 1	2–3	18.5	.295	.182	.000	.000	.477
1911 Oct. 3	3 40	3–4	41	191.285	192.178	0.000	0.000	383.463
7	3 24	2	36.5	.255	.170	.000	.000	.425
8	3 18	2	42	.284	.165	.000	.000	.449
9	2 59	2	48	.294	.194	.000	.000	.488
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	383.480

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	Residuals. R
C.	0.880	+0.000	0.880	$+1.0\,x - 1.87\,y - 0.24\,z = -0.010$	−0.001
	.876	+ .000	.876	$1.0 \quad 1.82 \quad 0.23 \quad - .014$	− .006
	.884	+ .000	.884	$1.0 \quad 1.80 \quad 0.23 \quad - .006$	+ .002
	.887	− .000	.887	$1.0 \quad 1.78 \quad 0.23 \quad - .003$	+ .005
C.	0.859	−0.000	0.859	$+1.0\,x + 1.84\,y + 0.14\,z = -0.031$	−0.022
	.863	+ .000	.863	$1.0 \quad 1.85 \quad 0.14 \quad - .027$	− .018
	.897	− .000	.897	$1.0 \quad 1.85 \quad 0.14 \quad + .007$	+ .016
	.873	+ .000	.873	$1.0 \quad 1.86 \quad 0.15 \quad - .017$	− .008
	.890	+ .000	.890	$1.0 \quad 1.86 \quad 0.15 \quad + .000$	+ .009
	.891	− .000	.891	$1.0 \quad 1.90 \quad 0.16 \quad + .001$	+ .010
	.885	− .000	.885	$1.0 \quad 1.90 \quad 0.16 \quad - .005$	+ .004
	.887	+ .000	.887	$1.0 \quad 1.91 \quad 0.16 \quad - .003$	+ .006
C.	0.893	+0.000	0.893	$+1.0\,x - 1.90\,y + 0.75\,z = +0.003$	−0.004
	.915	+ .000	.915	$1.0 \quad 1.85 \quad 0.76 \quad + .025$	+ .018
	.881	+ .000	.881	$1.0 \quad 1.83 \quad 0.77 \quad - .009$	− .016
	.900	− .000	.900	$1.0 \quad 1.82 \quad 0.77 \quad + .010$	+ .003
Assumed Mean Difference:			0.890		

Normals:

$$+16.00\,x + 0.30\,y + 3.32\,z = -0.079$$
$$+0.30 \quad +54.93 \quad -1.70 \quad = -0.132$$
$$+3.32 \quad -1.70 \quad +2.72 \quad = +0.019$$

Solution:

	R	R	
x =	−0.0082	±0.0024	Wt. 11.84
y =	−0.0019	±0.0012	53.40
z =	+0.0158	±0.0060	1.97

$[nn] = 0.00322$ $[vv] = 0.00203$ Prob. Error 1 Eq. = ±0″.107

$\pi = -0''.024 \pm 0''.015$

ζ Orionis	B. D. −2°, 1338	Mag. 2	R. A. $5^h\ 33.4^m$	Decl. −2° 2′	Pos. Angle.
a	−2°, 1307	8.5	5 28.5	−2 28	250°.4
b	−1°, 1019	8.6	5 38.1	−1 40	73°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Oct.	9	3 53	3	49.5	374.003	346.848	0.000	0.000	720.851
	10	3 29	3–4	42.5	373.976	.844	.000	.000	.820
	11	3 21	2–3	52.5	.991	.830	.000	.000	.821
	12	3 51	2	37	.968	.829	.000	.000	.797
1911 Feb.	15	7 54	2	10	373.980	346.821	0.000	0.000	720.801
	16	7 28	2–3	22	.958	.817	.000	.000	.775
	16	8 0	2–3	20.5	.969	.819	.000	.000	.788
	21	7 29	3–4	11	.979	.811	.000	.000	.790
	22	8 32	2–3	22	.969	.843	.000	.000	.812
	23	6 55	3	24	.949	.799	.000	.000	.748
	27	8 11	2	28.5	.957	.801	.000	.000	.758
	28	7 23	2–3	18.5	.983	.834	.000	.000	.817
1911 Oct.	3	4 20	3–4	40.5	373.982	346.834	0.000	0.000	720.816
	7	4 3	2	36	.987	.837	.000	.000	.824
	8	4 12	2	41	.977	.839	.000	.000	.816
	9	3 33	2	47	374.014	.873	.000	.000	.887
					Assumed Annual Proper Motion and Mean Sum:		0.000	0.000	720.800

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	27.155	−0.002	27.153	+1.0 *x*	+1.66 *y*	−0.23 *z*	= +0.008	+0.007
	.132	− .001	.131	1.0	1.64	0.23	− .014	− .015
	.161	− .001	.160	1.0	1.62	0.23	+ .015	+ .014
	.139	+ .000	.139	1.0	1.60	0.22	− .006	− .007
C.	27.159	−0.000	27.159	+1.0 *x*	−1.80 *y*	+0.12 *z*	= +0.014	+0.009
	.141	+ .001	.142	1.0	1.81	0.13	− .003	− .008
	.150	+ .000	.150	1.0	1.81	0.13	+ .005	− .000
	.168	+ .000	.168	1.0	1.85	0.14	+ .023	+ .018
	.126	− .000	.126	1.0	1.85	0.14	− .019	− .024
	.150	+ .002	.152	1.0	1.86	0.14	+ .007	+ .002
	.156	+ .002	.158	1.0	1.87	0.16	+ .013	+ .008
	.149	− .001	.148	1.0	1.88	0.16	+ .003	− .002
C.	27.148	−0.001	27.147	+1.0 *x*	+1.76 *y*	+0.75 *z*	= +0.002	+0.004
	.150	− .001	.149	1.0	1.69	0.76	+ .004	+ .006
	.138	− .001	.137	1.0	1.68	0.77	− .008	− .006
	.141	− .003	.138	1.0	1.66	0.77	− .007	− .005
	Assumed Mean Difference:		27.145					

				R		R	R	
Normals:	+16.00 *x*	− 1.42 *y*	+3.26 *z*	= +0.037	*Solution:*	*x* = +0.0028	±0.0023	Wt. 11.82
	− 1.42	+49.30	+1.61	= −0.089		*y* = −0.0016	±0.0011	47.40
	+ 3.26	+ 1.61	+2.69	= −0.002		*z* = −0.0031	±0.0056	1.96

$[nn] = 0.00200$ $[vv] = 0.00174$ Prob. Error 1 Eq. = ±″0.099

$\pi = -″0.020 \pm ″0.014$

κ Orionis	B. D. −9°, 1235	Mag. 2.5	R. A. 5^h 40.9^m	Decl. −9° 44′	Pos. Angle.
a	−9°, 1203	8.5	5 34.1	−9 52	265°.1
b	−9°, 1262	8.0	5 48.0	−9 13	74°.0

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Oct. 9	5 16	3	48.5	477.354	519.206	0.000	0.000	996.560
10	4 47	3	43	.368	.197	.000	.000	.565
11	4 41	2–3	51.5	.372	.205	.000	.000	.577
12	4 29	2	35.5	.326	.194	.000	.000	.520
1911 Feb. 10	7 35	2–3	26	477.325	519.193	0.000	0.000	996.518
11	6 22	2	26.5	.346	.186	.000	.000	.532
11	7 25	2	26	.335	.189	.000	.000	.524
15	6 39	2	12	.335	.200	.000	.000	.535
15	7 15	2	11	.329	.172	.000	.000	.501
16	6 51	2–3	22	.311	.151	.000	.000	.462
19	7 11	3–4	20.5	.334	.193	.000	.000	.527
21	6 38	3–4	12	.316	.164	.000	.000	.480
1911 Oct. 3	5 4	3–4	40.5	477.342	519.187	0.000	0.000	996.529
7	4 44	2	35.5	.343	.199	.000	.000	.542
7	5 19	2	35	.342	.208	.000	.000	.550
9	4 11	2	47	.369	.207	.000	.000	.576
Assumed Annual Proper Motion and Mean Sum:						0.000	0.000	996.530

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
C.	41.852	−0.001	41.851	+1.0 x	−1.76 y	−0.23 z	=	+0.001	+0.007
	.829	− .001	.828	1.0	1.74	0.23	=	− .022	− .016
	.833	− .002	.831	1.0	1.73	0.23	=	− .019	− .013
	.868	+ .000	.868	1.0	1.71	0.22	=	+ .018	+ .023
C.	41.868	+0.001	41.869	+1.0 x	+1.71 y	+0.11 z	=	+0.019	+0.016
	.840	− .000	.840	1.0	1.72	0.11	=	− .010	− .013
	.854	+ .000	.854	1.0	1.72	0.11	=	+ .004	+ .001
	.865	− .000	.865	1.0	1.78	0.12	=	+ .015	+ .012
	.843	+ .001	.844	1.0	1.78	0.12	=	− .006	− .009
	.840	+ .003	.843	1.0	1.79	0.13	=	− .007	− .010
	.859	+ .000	.859	1.0	1.83	0.13	=	+ .009	+ .006
	.848	+ .002	.850	1.0	1.85	0.14	=	+ .000	− .003
C.	41.845	+0.000	41.845	+1.0 x	−1.86 y	+0.75 z	=	−0.005	−0.005
	.856	− .001	.855	1.0	1.79	0.76	=	+ .005	+ .005
	.866	− .001	.865	1.0	1.79	0.76	=	+ .015	+ .015
	.838	− .002	.836	1.0	1.76	0.77	=	− .014	− .014
Assumed Mean Difference:	41.850								

Normals:

			R
+16.00 x	+ 0.04 y	+3.10 z	= +0.003
+ 0.04	+50.16	−2.17	= +0.079
+ 3.10	− 2.17	+2.64	= +0.009

Solution:

	R	R	
x =	−0.0010	±0.0026	Wt. 12.22
y =	+0.0018	±0.0013	47.84
z =	+0.0060	±0.0064	1.95

$[mm]$ = 0.00251 $[vv]$ = 0.00234 Prob. Error 1 Eq. = ±″0.114

π = +″0.023 ±″0.016

Lalande 13284–5	B. D. −5°, 1844	Mag. 6.9	R. A. $6^h\ 45.2^m$	Decl. −5° 0′	Pos. Angle.
a	−4°, 1665	7.9	6 40.8	−5 0	270°.6
b	−5°, 1882	8.5	6 49.7	−5 10	98°.8

Date.	Sid. Time. h. m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Oct. 12	5 10	2	35	311.555	326.052	−0.010	+0.010	637.607
16	4 40	2–3	51	.563	.041	.009	.009	.604
16	5 21	2–3	49.5	.557	.049	.009	.009	.606
23	5 18	3	38.5	.551	.069	.008	.008	.620
1911 Feb. 27	9 2	2	26	311.512	326.090	+0.007	−0.007	637.602
28	8 45	2–3	18.5	.511	.076	.007	.007	.587
Mar. 8	8 22	3	29.5	.526	.082	.008	.008	.608
8	8 57	3	29.5	.525	.091	.008	.008	.616
10	8 33	3–4	40	.509	.073	.008	.008	.582
10	9 5	3–4	39.5	.522	.070	.008	.008	.592
16	9 24	3	17	.506	.071	.009	.009	.577
24	9 16	2	21	.520	.085	.010	.010	.605
1911 Oct. 12	4 33	3–4	46.5	311.532	326.103	+0.034	−0.034	637.635
12	5 9	3–4	45.5	.544	.117	.034	.034	.661
15	4 27	1–2	48.5	.519	.118	.035	.035	.637
15	5 2	1–2	47.5	.531	.123	.035	.035	.654
Assumed Annual Proper Motion and Mean Sum:						−0.044	+0.044	637.610

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	14.497	+0.000	14.517	+1.0 x	−1.96 y	−0.22 z	= −0.013	+0.003
	.478	+ .000	.496	1.0	1.94	0.21	− .034	− .018
	.492	+ .000	.510	1.0	1.94	0.21	− .020	− .004
	.518	− .000	.534	1.0	1.88	0.19	+ .004	+ .019
C.	14.578	+0.000	14.564	+1.0 x	+1.68 y	+0.15 z	= +0.034	+0.018
	.565	+ .001	.552	1.0	1.69	0.16	+ .022	+ .006
	.556	+ .000	.540	1.0	1.80	0.18	+ .010	− .007
	.566	− .000	.550	1.0	1.80	0.18	+ .020	+ .003
	.564	+ .001	.549	1.0	1.83	0.19	+ .019	+ .001
	.548	+ .000	.532	1.0	1.83	0.19	+ .002	− .016
	.565	+ .001	.548	1.0	1.89	0.20	+ .018	− .000
	.565	+ .000	.545	1.0	1.96	0.22	+ .015	− .004
C.	14.571	−0.001	14.502	+1.0 x	−1.96 y	+0.78 z	= −0.028	−0.012
	.573	− .001	.504	1.0	1.96	0.78	− .026	− .010
	.599	− .001	.528	1.0	1.95	0.79	− .002	+ .014
	.592	− .001	.521	1.0	1.95	0.79	− .009	+ .007
Assumed Mean Difference:	14.530							

Normals: (R)

+16.00 x	− 1.04 y	+3.78 z	=	+0.012
− 1.04	+56.44	−1.86	=	+0.500
+ 3.78	− 1.86	+2.91	=	−0.011

Solution:

	R	R	
x =	+0.0013	±0.0024	Wt. 11.06
y =	+0.0089	±0.0011	55.09
z =	+0.0001	±0.0057	1.97

$[nn] = 0.00640$ $[vv] = 0.00187$ Prob. Error 1 Eq. = $\pm 0''.102$

$\pi = +0''.113 \pm 0''.014$

Lalande 14146	B. D. −12°, 1871	Mag. 7.3	R. A. 7h 9.2m	Decl. −12° 48′	Pos. Angle.
a	−12°, 1809	7.5	7 1.8	−12 39	274°.8
b	−13°, 1979	8.0	7 16.7	−13 5	98°.7

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Oct. 23	6 4	3	38.5	511.372	525.335	−0.008	+0.008	1036.707
28	5 40	3–4	33	.396	.301	.008	.008	.697
29	5 52	3–4	30.5	.370	.308	.008	.008	.678
31	5 47	3	35	.376	.297	.007	.007	.673
1911 Mar. 13	9 2	2–3	34.5	511.356	525.337	+0.008	−0.008	1036.693
16	8 37	3	17	.338	.299	.008	.009	.636
17	8 15	1	28	.340	.332	.009	.009	.672
20	8 23	3–4	36.5	.371	.316	.009	.009	.687
20	9 4	3–4	36	.331	.332	.009	.009	.663
21	8 24	2	33	.350	.327	.009	.009	.677
21	9 1	2	32.5	.361	.331	.009	.009	.692
24	8 37	2	21	.328	.309	.009	.009	.637
1911 Oct. 12	5 48	3–4	44	511.369	525.360	+0.033	−0.034	1036.728
15	5 47	1–2	47	.365	.352	.033	.034	.716
15	6 25	1–2	46	.384	.347	.033	.034	.730
23	5 10	3–4	45	.344	.357	.034	.035	.700
24	5 29	3–4	38.5	.331	.317	.034	.035	.647
Assumed Annual Proper Motion and Mean Sum:						−0.042	+0.043	1036.690

Observer.	Difference R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
C.	13.963	−0.000	13.979	+1.0 *x*	−1.94 *y*	−0.19 *z*	=	+0.029	+0.031
	.905	− .000	.921	1.0	1.91	0.18		− .029	− .026
	.938	+ .000	.954	1.0	1.90	0.18		+ .004	+ .006
	.921	+ .000	.935	1.0	1.88	0.17		− .015	− .012
C.	13.981	−0.000	13.965	+1.0 *x*	+1.77 *y*	+0.19 *z*	=	+0.015	+0.007
	.961	− .001	.943	1.0	1.82	0.20		− .007	− .015
	.992	+ .000	.974	1.0	1.83	0.21		+ .024	+ .016
	.945	+ .000	.927	1.0	1.88	0.21		− .023	− .031
	14.001	+ .000	.983	1.0	1.88	0.21		+ .033	+ .025
	13.977	+ .000	.959	1.0	1.89	0.22		+ .009	+ .001
	.970	− .000	.952	1.0	1.89	0.22		+ .002	− .006
	.981	− .001	.962	1.0	1.91	0.22		+ .012	+ .004
C.	13.991	−0.001	13.923	+1.0 *x*	−1.97 *y*	+0.78 *z*	=	−0.027	+0.003
	.987	− .000	.920	1.0	1.97	0.79		− .030	− .000
	.963	− .001	.895	1.0	1.97	0.79		− .055	− .025
	14.013	− .000	.944	1.0	1.94	0.81		− .006	+ .024
	13.986	+ .001	.918	1.0	1.94	0.81		− .032	− .002
Assumed Mean Difference:	13.950								

Normals:

				R
+17.00 *x*	− 2.55 *y*	+4.94 *z*	=	−0.096
− 2.55	+61.35	−3.31	=	+0.434
+ 4.94	− 3.31	+3.65	=	−0.105

Solution:

	R	R	
x =	+0.0033	±0.0041	Wt. 10.26
y =	+0.0057	±0.0017	58.00
z =	+0.0279	±0.0090	2.11

$[nn] = 0.01033$ $[vv] = 0.00528$ Prob. Error 1 Eq. = ±0″.165

$\pi = +0''.072 \pm 0''.022$

Lalande 16304	B. D. −12°, 2449	Mag. 6.3	R. A. $8^h\ 11.5^m$	Decl. −12° 9′	Pos. Angle.
a	−11°, 2273	8.5	8 4.8	−11 55	278°.1
b	−12°, 2510	7.0	8 18.2	−12 17	95°.1

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections R	R	Corrected Sum. R
1910	Oct. 23	6 49	3	38.5	473.435	461.696	+0.006	−0.005	935.132
	28	6 20	3–4	33	.412	.685	.005	.004	.098
	29	6 39	3–4	30	.423	.708	.005	.004	.132
	31	6 32	3	34	.418	.686	.005	.004	.105
1911	Mar. 31	9 22	3	35	473.430	461.703	−0.007	+0.006	935.132
	31	10 3	3	34	.412	.698	.007	.006	.109
	Apr. 3	9 28	3–4	32.5	.421	.696	.007	.006	.116
	3	10 4	3–4	31.5	.397	.704	.007	.006	.100
	11	9 22	3–4	37	.438	.721	.008	.007	.158
	11	9 57	3–4	36	.425	.722	.008	.007	.146
	16	9 37	3–4	36.5	.423	.711	.008	.007	.133
	16	10 9	3–4	36	.424	.711	.008	.007	.134
1911	Nov. 1	6 47	3–4	29.5	473.466	461.715	−0.024	+0.021	935.178
	1	7 31	3	28.5	.468	.695	.024	.021	.160
	3	6 38	2–3	30	.452	.690	.024	.021	.139
	3	7 21	2–3	29.5	.449	.695	.024	.021	.141
							+0.029	−0.025	935.130

Assumed Annual Proper Motion and Mean Sum: +0.029 −0.025 935.130

Observer.	Difference R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
C.	11.739	−0.000	11.750	+1.0 *x*	+1.97 *y*	−0.19 *z*	=	+0.040	+0.012
	.727	+ .000	.736	1.0	1.97	0.18		+ .026	− .002
	.715	− .000	.724	1.0	1.97	0.18		+ .014	− .014
	.732	+ .000	.741	1.0	1.96	0.17		+ .031	+ .003
C.	11.727	−0.000	11.714	+1.0 *x*	−1.80 *y*	+0.24 *z*	=	+0.004	+0.014
	.714	+ .000	.701	1.0	1.80	0.24		− .009	+ .001
	.725	+ .000	.712	1.0	1.84	0.25		+ .002	+ .012
	.693	+ .000	.680	1.0	1.84	0.25		− .030	− .020
	.717	− .000	.702	1.0	1.93	0.27		− .008	+ .004
	.703	− .000	.688	1.0	1.93	0.27		− .022	− .010
	.712	− .000	.697	1.0	1.97	0.29		− .013	− .001
	.713	− .000	.698	1.0	1.97	0.29		− .012	+ .000
C.	11.751	−0.001	11.705	+1.0 *x*	+1.95 *y*	+0.83 *z*	=	−0.005	−0.010
	.773	− .000	.728	1.0	1.95	0.83		+ .018	+ .013
	.762	− .000	.717	1.0	1.94	0.84		+ .007	+ .003
	.754	− .000	.709	1.0	1.94	0.84		− .001	− .005

Assumed Mean Difference: 11.710

Normals:

			R
+16.00 *x*	+ 0.57 *y*	+4.72 *z*	= +0.042
+ 0.57	+49.04	+1.14	= +0.423
+ 4.72	+ 1.14	+3.47	= −0.026

Solution:

	R	R	
x =	+0.0089	±0.0024	Wt. 9.56
y =	+0.0075	±0.0009	58.56
z =	−0.0220	±0.0051	2.05

$[nn] = 0.00569$ $[vv] = 0.00150$ Prob. Error 1 Eq. = $\pm 0''.092$

$\pi = +0''.095 \pm 0''.012$

α Hydrae	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	−7°, 2791	8.3	9h 15.4m	−7° 51′	278°.7
b	−7°, 2836	7.0	9h 25.9m	−7° 52′	83°.2

Date		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1909	Nov. 29	8 46	3	26.5	358.962	384.906	−0.005	+0.005	743.868
	Dec. 5	8 56	2–3	27.5	.947	.910	.005	.005	.857
	5	9 36	2–3	28	.952	.907	.005	.005	.859
	8	8 46	2	19.5	.970	.891	.005	.005	.861
	8	9 24	2	19	.969	.910	.005	.005	.879
1910	Apr. 28	11 12	3–4	44.5	358.954	384.912	−0.003	+0.003	743.866
	May 6	11 9	3	51	.975	.909	.003	.003	.884
	6	11 41	3	51	.976	.891	.003	.003	.867
	7	11 4	3–4	58.5	.962	.916	.003	.003	.878
1910	Oct. 28	7 3	3–4	33	358.976	384.911	−0.001	+0.001	743.887
	Nov. 17	7 57	3–4	25.5	.948	.903	.001	.001	.851
	17	8 32	3–4	25	.976	.918	.001	.001	.894
	26	8 21	3–4	33.5	.955	.894	.000	.000	.849
1911	Apr. 18	10 32	1–2	41.5	358.945	384.885	+0.001	−0.001	743.830
	18	11 3	1–2	41	.947	.893	.001	.001	.840
	24	10 36	3	53	.942	.906	.002	.002	.848
	24	11 10	3	52.5	.950	.896	.002	.002	.846
	25	10 44	3–4	48	.957	.902	.002	.002	.859
	25	11 19	3–4	47.5	.963	.894	.002	.002	.857
	26	10 41	1–2	46.5	.956	.887	.002	.002	.843
	26	11 15	1–2	45.5	.956	.891	.002	.002	.847
1911	Nov. 3	8 11	2–3	29	358.970	384.898	+0.004	−0.004	743.868
	7	7 10	3	42.5	.990	.914	.004	.004	.904
	7	7 49	3	42	359.007	.930	.004	.004	.937
	22	8 4	3–4	21.5	358.953	.907	.004	.004	.860
		Assumed Annual Proper Motion and Mean Sum:					−0.005	+0.005	743.870

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	25.944	+0.000	25.954	+1.0 x	−1.76 y	−1.09 z	= +0.014	−0.000
	.963	+ .000	.973	1.0	1.69	1.07	+ .033	+ .019
	.955	+ .000	.965	1.0	1.69	1.07	+ .025	+ .011
	.921	+ .000	.931	1.0	1.65	1.07	− .009	− .023
	.941	− .000	.951	1.0	1.65	1.07	+ .011	− .003
C.	25.958	+0.000	25.964	+1.0 x	+1.86 y	−0.68 z	= +0.024	+0.013
	.934	− .000	.940	1.0	1.88	0.66	+ .000	− .011
	.915	+ .000	.921	1.0	1.88	0.66	− .019	− .030
	.954	− .000	.960	1.0	1.88	0.66	+ .020	+ .009
C.	25.935	−0.001	25.936	+1.0 x	−1.83 y	−0.18 z	= −0.004	−0.006
	.955	+ .001	.958	1.0	1.84	0.12	+ .018	+ .017
	.942	− .001	.943	1.0	1.84	0.12	+ .003	+ .002
	.939	+ .001	.940	1.0	1.79	0.10	+ .000	− .001

α Hydrae — *continued.*

Observer.	Difference.	Scale Value Correction.	Corrected Difference.	Equations of Condition.	Residuals.
	R	R	R	R	R
C.	25.940	+0.001	25.939	$+1.0x + 1.79y + 0.29z = -0.001$	+0.001
	.946	+ .001	.945	1.0 1.79 0.29 + .005	+ .007
	.964	+ .001	.961	1.0 1.83 0.31 + .021	+ .024
	.946	+ .001	.943	1.0 1.83 0.31 + .003	+ .006
	.945	+ .000	.941	1.0 1.83 0.31 + .001	+ .004
	.931	+ .000	.927	1.0 1.83 0.31 − .013	− .010
	.931	+ .001	.928	1.0 1.84 0.31 − .012	− .009
	.935	+ .001	.932	1.0 1.84 0.31 − .008	− .005
C.	25.928	+0.000	25.920	$+1.0x - 1.84y + 0.84z = -0.020$	−0.008
	.924	− .001	.915	1.0 1.85 0.85 − .025	− .013
	.923	− .002	.913	1.0 1.85 0.85 − .027	− .015
	.954	+ .000	.946	1.0 1.82 0.89 + .006	+ .019

Assumed Mean Difference: 25.940

		R		R	R	
Normals:	$+25.00x - 1.02y - 2.68z$	$= +0.046$	*Solution:*	$x =$	$+0.0004 \pm 0.0019$	Wt. 24.37
	$-1.02 + 81.76 + 3.20$	$= +0.004$		$y =$	$+0.0006 \pm 0.0010$	80.85
	$-2.68 + 3.20 + 11.28$	$= -0.156$		$z =$	$+0.0138 \pm 0.0028$	10.87

$[nn] = 0.00644$ $[vv] = 0.00427$ Prob. Error 1 Eq. $= \pm 0''.119$

$\pi = +0''.008 \pm 0''.013$

Weisse		B. D.	Mag.	R. A.	Decl.	Pos. Angle.
10^h, 520		−11°, 2918	5.7	10^h 29.3^m	−11° 27′	
	a	−11°, 2898	8.3	10 24.9	−11 27	270°.6
	b	−11°, 2929	8.5	10 33.8	−11 27	88°.9

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Nov. 26	9 10	3–4	33	311.520	308.921	+0.002	−0.002	620.441
	27	8 56	2	28.5	.503	.919	.002	.002	.422
	Dec. 4	10 0	3	23	.496	.918	.002	.002	.414
	8	9 10	3–4	15	.534	.912	.002	.002	.446
1911	May 3	11 36	3	40.5	311.499	308.887	−0.008	+0.007	620.385
	3	12 15	3	39	.537	.902	.008	.007	.438
	5	11 20	1–2	47.5	.511	.909	.008	.007	.419
	5	11 55	1–2	47	.513	.898	.008	.007	.410
	5	12 27	1–2	46	.515	.899	.008	.007	.413
	6	11 34	2–3	52.5	.510	.916	.008	.008	.426
	6	12 10	2–3	51.5	.514	.914	.008	.008	.428
	13	11 59	3	61	.538	.932	.009	.008	.469

Weisse 10^h, 520 — *continued.*

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1911	Nov. 22	8 55	3–4	21	311.523	308.903	−0.021	+0.020	620.425
	Dec. 6	8 34	2	28	.524	.895	.022	.020	.417
	6	9 11	2	27	.539	.897	.022	.020	.434
	7	8 48	2–3	36	.536	.888	.022	.020	.422
					Assumed Annual Proper Motion and Mean Sum:		+0.024	−0.022	620.420

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	2.599	−0.000	2.603	+1.0 x	+1.82 y	−0.10 z =	+0.003	+0.003
	.584	− .000	.588	1.0	1.81	0.10	− .012	− .012
	.578	+ .000	.582	1.0	1.80	0.08	− .018	− .017
	.622	− .000	.626	1.0	1.77	0.07	+ .026	+ .027
C.	2.612	+0.000	2.597	+1.0 x	−1.73 y	+0.33 z =	−0.003	+0.002
	.635	− .000	.620	1.0	1.73	0.33	+ .020	+ .025
	.602	+ .000	.587	1.0	1.75	0.34	− .013	− .007
	.615	+ .000	.600	1.0	1.75	0.34	+ .000	+ .005
	.616	+ .000	.601	1.0	1.75	0.34	+ .001	+ .006
	.594	− .000	.578	1.0	1.76	0.34	− .022	− .016
	.600	− .000	.584	1.0	1.76	0.34	− .016	− .010
	.606	− .000	.589	1.0	1.83	0.36	− .011	− .005
C.	2.620	−0.000	2.579	+1.0 x	+1.81 y	+0.89 z =	−0.021	−0.014
	.629	+ .000	.587	1.0	1.79	0.93	− .013	− .006
	.642	− .000	.600	1.0	1.79	0.93	+ .000	+ .007
	.648	− .000	.606	1.0	1.78	0.93	+ .006	+ .013
	Assumed Mean Difference: 2.600							

Normals:

			R
+16.00 x	+ 0.31 y	+6.05 z =	−0.073
+ 0.35	+50.51	+1.20 =	+0.024
+ 6.05	+ 1.20	+4.35 =	−0.040

Solution:

	R	R	
x =	−0.0022	±0.0036	Wt. 7.54
y =	+0.0006	±0.0014	49.94
z =	−0.0064	±0.0069	2.04

$[nn]$ = 0.00290 $[vv]$ = 0.00281 Prob. Error 1 Eq. = ±0.″125

π = +0.″008 ±0.″018

Piazzi 11^h, 32 B. D. −4°, 3049 Mag. 7.2 R. A. 11^h 10.9^m Decl. −4° 16′ Pos. Angle.

a	−4°, 3040	8.5	11 8.0	−4 9	280°.2
b	−4°, 3056	8.8	11 14.0	−4 21	95°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Nov. 27	9 38	2	28	208.399	218.953	+0.006	−0.006	427.352
	Dec. 8	10 8	2–3	15.5	.411	.922	.004	.004	.333
	20	9 29	3	18.5	.437	.921	.002	.002	.358
	20	10 9	3	18.5	.431	.938	.002	.002	.369

Piazzi 11h, 32 — *continued.*

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. *b* R	*a* R	Corrected Sum. R
1911 May 13	12 50	3	60	208.452	218.912	−0.022	+0.022	427.364
13	13 28	3	59	.468	.898	.022	.022	.366
14	12 30	3	50	.460	.894	.022	.022	.354
14	13 9	3	49.5	.460	.916	.022	.022	.376
22	12 46	3–4	70.5	.453	.930	.024	.024	.383
22	13 24	3–4	70	.450	.892	.024	.024	.342
June 1	13 22	2	58.5	.450	.898	.025	.025	.348
1	14 56	2	57.5	.470	.885	.025	.025	.355
1911 Dec. 7	9 31	2–3	35.5	208.506	218.849	−0.058	+0.058	427.355
7	10 12	2–3	35	.496	.860	.058	.058	.356
10	9 0	2–3	42	.512	.856	.058	.058	.368
13	9 2	3–4	32	.473	.842	.059	.059	.315
Assumed Annual Proper Motion and Mean Sum:						+0.062	−0.062	427.360

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	10.554	+0.000	10.542	+1.0 *x*	−1.83 *y*	−0.10 *z*	= +0.052	+0.033
	.511	+ .001	.504	1.0	1.87	0.07	+ .014	− .004
	.484	+ .000	.480	1.0	1.82	0.03	− .010	− .027
	.507	− .000	.503	1.0	1.82	0.03	+ .013	− .004
C.	10.460	−0.000	10.504	+1.0 *x*	+1.75 *y*	+0.36 *z*	+ +0.014	+0.011
	.430	− .000	.474	1.0	1.75	0.36	− 0.16	− .018
	.434	− .000	.478	1.0	1.77	0.36	− .012	− .014
	.456	− .000	.500	1.0	1.77	0.36	+ .010	+ .007
	.477	− .001	.524	1.0	1.86	0.39	+ .034	+ .033
	.442	+ .000	.490	1.0	1.86	0.39	+ .000	− .001
	.448	+ .000	.498	1.0	1.94	0.41	+ .008	+ .007
	.415	+ .000	.465	1.0	1.94	0.41	− .025	− .026
C.	10.343	+0.000	10.459	+1.0 *x*	−1.89 *y*	+0.93 *z*	= −0.031	−0.013
	.364	+ .000	.480	1.0	1.89	0.93	− .010	+ .008
	.344	− .000	.460	1.0	1.88	0.94	− .030	− .011
	.369	+ .001	.488	1.0	1.87	0.95	− .002	+ .017

Assumed Mean Difference: 10.490

Normals: (R)

+16.00 *x*	− 0.23 *y*	+6.56 *z*	= +0.009
− 0.23	+54.46	−1.04	= +0.034
+ 6.56	− 1.04	+4.69	= −0.070

Solution: (R)

x =	+0.0157	±0.0050	Wt. 6.79
y =	−0.0000	±0.0018	54.01
z =	−0.0367	±0.0092	1.98

$[nn] = 0.00767$ $[vv] = 0.00498$ Prob. Error 1 Eq. = $\pm 0''.167$

$\pi = -0''.000 \pm 0''.023$

Lalande 22585	B. D. −9°, 3413	Mag. 6.4	R. A. 11h 53.3m	Decl. −9° 37′	Pos. Angle.
a	−9°, 3400	8.0	11 50.4	−9 21	291°.0
b	−9°, 3422	8.0	11 55.6	−9 56	119°.7

Date.	Sid. Time. h. m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Dec. 30	11 14	3–4	6	219.558	181.908	+0.000	−0.000	401.466
1911 Jan. 4	10 37	3–4	8	.555	.899	− .000	+ .000	.454
5	10 45	3	14	.560	.900	.000	.000	.460
15	10 52	3	18.5	.543	.899	.001	.001	.442
1911 May 25	12 41	2–3	59	219.551	181.901	−0.007	+0.009	401.454
25	12 59	2–3	59	.546	.929	.007	.009	.477
26	12 41	3	62	.539	.911	.007	.009	.452
26	12 58	3	62	.546	.909	.007	.009	.457
27	12 39	3	60	.537	.913	.007	.009	.452
27	12 58	3	59	.544	.921	.007	.009	.467
28	12 41	2–3	65	.549	.905	.007	.009	.456
28	13 0	2–3	64	.529	.897	.007	.009	.428
1911 Dec. 19	10 45	3	20	219.547	181.867	−0.016	+0.022	401.420
19	11 10	3	20	.579	.899	.016	.022	.484
22	10 3	2	34	.550	.865	.017	.023	.421
22	10 32	2	34	.553	.878	.017	.023	.437
Assumed Annual Proper Motion and Mean Sum:						+0.017	−0.023	401.451

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	37.650	−0.001	37.649	$+1.0\,x + 1.93\,y - 0.00\,z =$	+0.014	−0.003
	.656	− .000	.656	$1.0 \quad 1.90 \quad +0.01$	+ .021	+ .004
	.660	− .000	.660	$1.0 \quad 1.90 \quad 0.01$	+ .025	+ .008
	.644	+ .000	.642	$1.0 \quad 1.81 \quad 0.04$	+ .007	− .009
S.	37.650	−0.000	37.634	$+1.0\,x - 1.78\,y + 0.40\,z =$	−0.001	+0.018
	.617	− .002	.599	$1.0 \quad 1.78 \quad 0.40$	− .036	− .017
	.628	− .000	.612	$1.0 \quad 1.79 \quad 0.40$	− .023	− .004
	.637	− .001	.620	$1.0 \quad 1.79 \quad 0.40$	− .015	+ .004
	.624	− .000	.608	$1.0 \quad 1.80 \quad 0.40$	− .027	− .007
	.623	− .001	.606	$1.0 \quad 1.80 \quad 0.40$	− .029	− .009
	.644	− .000	.628	$1.0 \quad 1.82 \quad 0.40$	− .007	+ .013
	.632	+ .002	.618	$1.0 \quad 1.82 \quad 0.40$	− .017	+ .003
S.	37.680	+0.003	37.645	$+1.0\,x + 1.95\,y + 0.97\,z =$	+0.010	+0.003
	.680	− .003	.639	$1.0 \quad 1.95 \quad 0.97$	+ .004	− .003
	.685	+ .003	.648	$1.0 \quad 1.95 \quad 0.98$	+ .013	+ .006
	.675	+ .001	.636	$1.0 \quad 1.95 \quad 0.98$	+ .001	− .006
Assumed Mean Difference:			37.635			

Normals:

				R
+16.00 *x*	+ 0.96 *y*	+7.16 *z*	=	−0.060
+ 0.96	+55.26	+1.97	=	+0.460
+ 7.16	+ 1.97	+5.08	=	−0.034

Solution:

	R	R	Wt.
x =	+0.0006	±0.0027	5.9
y =	+0.0087	±0.0009	53.9
z =	−0.0109	±0.0049	1.8

$[nn] = 0.00556$ $[vv] = 0.00122$ Prob. Error 1 Eq. = ±0.″083

$\pi = +0.''111 \pm 0.''011$

Lalande 22701	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	−0°, 2532	8.4	11h 57.9m	−0° 43′	
b	+0°, 2875	8.7	11 53.0	+0 7	304°.0
	−1°, 2628	8.5	12 3.0	−1 26	119°.3

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Dec. 30	9 27	3–4	8.5	415.350	423.964	−0.000	+0.000	839.314
1911 Jan. 4	9 31	3	9	.374	424.008	+ .000	− .000	.382
5	10 14	3	14	.391	423.997	.000	.000	.388
15	9 20	3	20.5	.398	424.013	.001	.001	.411
1911 May 18	13 58	2–3	66	415.367	424.051	+0.013	−0.013	839.418
18	14 31	2–3	66	.374	.052	.013	.013	.426
24	14 12	2–3	68.5	.367	.040	.013	.014	.406
29	14 0	2	64.5	.377	.053	.014	.014	.430
30	13 8	3–4	61	.336	.026	.014	.014	.362
30	13 31	3–4	61	.349	.030	.014	.014	.379
June 1	14 30	3	57	.365	.039	.014	.015	.403
1	14 48	3	55.5	.355	.036	.014	.015	.390
1911 Dec. 29	9 16	3	19	415.354	424.051	+0.033	−0.035	839.403
29	9 48	3	18	.361	.042	.033	.035	.401
1912 Jan. 1	9 30	2	19	.312	.031	.033	.035	.341
1	9 52	2	19	.335	.021	.033	.035	.354
Assumed Annual Proper Motion and Mean Sum:						−0.033	+0.035	839.387

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	8.614	+0.001	8.615	$+1.0\,x - 1.92\,y - 0.00\,z =$	−0.024	−0.002
	.634	+ .000	.634	$1.0 \quad 1.88 \quad +0.01$	− .005	+ .017
	.606	− .000	.606	$1.0 \quad 1.87 \quad 0.01$	− .033	− .011
	.615	− .000	.613	$1.0 \quad 1.77 \quad 0.04$	− .026	− .005
S.	8.684	−0.000	8.658	$+1.0\,x + 1.70\,y + 0.38\,z =$	+0.019	+0.007
	.678	− .000	.652	$1.0 \quad 1.70 \quad 0.38$	+ .013	+ .001
	.673	− .000	.646	$1.0 \quad 1.80 \quad 0.39$	+ .007	− .005
	.676	− .000	.648	$1.0 \quad 1.87 \quad 0.41$	+ .009	− .004
	.690	+ .000	.662	$1.0 \quad 1.88 \quad 0.41$	+ .023	+ .010
	.681	+ .000	.653	$1.0 \quad 1.88 \quad 0.41$	+ .014	+ .001
	.674	− .000	.645	$1.0 \quad 1.90 \quad 0.42$	+ .006	− .008
	.681	− .000	.652	$1.0 \quad 1.90 \quad 0.42$	+ .013	− .001
S.	8.697	−0.000	8.629	$+1.0\,x - 1.93\,y + 0.99\,z =$	−0.010	+0.001
	.681	− .000	.613	$1.0 \quad 1.93 \quad 0.99$	− .026	− .015
	.719	+ .000	.651	$1.0 \quad 1.91 \quad 1.00$	+ .012	+ .023
	.686	− .000	.618	$1.0 \quad 1.91 \quad 1.00$	− .021	− .010

Assumed Mean Difference: 8.639

Normals:

			R
+16.00 *x*	− 0.49 *y*	+7.26 *z* =	−0.029
− 0.49	+55.39	−1.84 =	+0.439
+ 7.26	− 1.84	+5.26 =	−0.004

Solution:

	R	R	
x =	−0.0067	±0.0030	Wt. 5.9
y =	+0.0082	±0.0010	54.0
z =	+0.0113	±0.0052	1.9

$[nn] = 0.00532 \quad [vv] = 0.00155$ Prob. Error 1 Eq. = ±0.″094

$\pi = +0.''104 \pm 0.''013$

Weisse	12^h, 69	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a		$-1°$, 2618	8.5	11 58.5	-1 39	291°.0
b		$-2°$, 3497	8.3	12 11.8	-2 31	97°.6

Date.		Sid. Time. h.	m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Dec. 21	9	35	3–4	9.5	502.836	478.343	−0.002	+0.002	981.179
	24	10	1	2–3	27.5	.835	.276	.001	.001	.111
	27	9	59	2–3	25.5	.800	.286	.001	.001	.086
	Jan. 7	10	41	2	26	.796	.285	+ .001	− .001	.081
1911	May 25	14	25	3	57	502.824	478.340	+0.022	−0.020	981.166
	26	14	45	3	60.5	.844	.344	.022	.020	.190
	27	14	22	3	57.5	.797	.325	.022	.020	.124
	27	14	59	3	56.5	.821	.333	.022	.020	.156
	28	14	55	3	61	.817	.330	.022	.020	.149
	29	13	31	2–3	65	.831	.356	.023	.021	.189
	29	14	3	2–3	65	.829	.343	.023	.021	.174
	June 3	14	27	2	58.5	.826	.336	.023	.021	.164
1911	Dec. 13	9	50	3–4	31	502.774	478.362	+0.053	−0.048	981.141
	18	9	29	2–3	24.5	.751	.335	.054	.049	.091
	18	10	9	2–3	24.5	.777	.335	.054	.049	.117
	19	9	27	3–4	20.5	.785	.338	.054	.049	.128
								Assumed Annual Proper Motion and Mean Sum:	−0.056	+0.051	981.140

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
C.	24.493	−0.001	24.488	+1.0 x	+1.92 y	−0.03 z	=	−0.042	−0.030
	.559	+ .001	.558	1.0	1.92	0.02		+ .028	+ .040
	.514	+ .001	.513	1.0	1.91	0.01		− .017	− .005
	.511	+ .001	.514	1.0	1.85	+0.02		− .016	− .005
C.	24.484	−0.001	24.525	+1.0 x	−1.77 y	+0.39 z	=	−0.005	−0.002
	.500	− .001	.541	1.0	1.79	0.40		+ .011	+ .014
	.472	+ .000	.514	1.0	1.80	0.40		− .016	− .014
	.488	− .000	.530	1.0	1.80	0.40		+ .000	+ .003
	.487	− .000	.529	1.0	1.82	0.40		− .001	+ .002
	.475	− .001	.518	1.0	1.83	0.41		− .012	+ .009
	.486	− .001	.529	1.0	1.83	0.41		− .001	+ .002
	.490	− .001	.533	1.0	1.88	0.42		+ .003	+ .005
C.	24.412	−0.000	24.513	+1.0 x	+1.89 y	+0.95 z	=	−0.017	−0.019
	.416	+ .001	.520	1.0	1.91	0.96		− .010	− .012
	.442	+ .001	.546	1.0	1.91	0.96		+ .016	+ .014
	.447	+ .000	.550	1.0	1.91	0.96		+ .020	+ .010
			Assumed Mean Difference: 24.530						

Normals:

			R
+16.00 x	+ 0.70 y	+7.02 z	= −0.059
− 0.70	+55.34	+1.34	= −0.033
+ 7.02	+ 1.34	+4.97	= +0.001

Solution:

	R	R	
x =	−0.0102	±0.0047	Wt. 6.05
y =	−0.0008	±0.0016	54.75
z =	+0.0148	±0.0085	1.87

$[nn] = 0.00469$ $[vv] = 0.00385$ Prob. Error 1 Eq. = $\pm 0''.147$

$\pi = -0''.010 \pm 0''.020$

Lalande 22954–68	B. D. −9°, 3468	Mag. 6.2	R. A. 12^h 7.7^m	Decl. −9° 28′	Pos. Angle.
a	−8°, 3293	8.8	12 3.0	−8 45	303°.0
b	−9°, 3483	8.5	12 12.8	−9 59	112°.6

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	P. M. Corrections. R	Corrected Sum. R
1910 Dec. 24	10 53	2–3	28	396.517	380.633	+0.001	−0.001	777.150
24	11 33	2–3	28.5	.492	.624	.001	.001	.116
27	10 42	3	25	.510	.614	.000	.000	.124
27	11 23	3	24	.499	.625	.000	.000	.124
1911 May 25	13 35	3	58	396.545	380.648	−0.019	+0.014	777.188
26	13 26	3	62	.531	.637	.020	.015	.163
26	14 3	3	61	.550	.639	.020	.015	.184
27	13 40	3	58	.535	.652	.020	.015	.182
28	13 35	3	63	.542	.646	.020	.015	.183
28	14 10	3	62.5	.554	.634	.020	.015	.183
June 3	13 44	2	59.5	.525	.632	.021	.016	.152
9	13 41	2–3	71	.513	.634	.021	.016	.142
1911 Dec. 19	10 9	3–4	20.5	396.560	380.599	−0.047	+0.036	777.148
29	11 17	2–3	18	.566	.631	.049	.037	.185
29	11 55	2–3	17.5	.554	.630	.049	.037	.172
1912 Jan. 1	11 13	3	17.5	.558	.625	.049	.037	.171
Assumed Annual Proper Motion and Mean Sum:						+0.049	−0.037	777.160

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	15.884	+0.000	15.886	+1.0 *x*	+1.94 *y*	−0.02 *z*	= +0.026	+0.003
	.868	+ .001	.871	1.0	1.94	0.02	+ .011	− .012
	.896	+ .001	.897	1.0	1.94	0.01	+ .037	+ .015
	.874	+ .001	.875	1.0	1.94	0.01	+ .015	− .008
C.	15.897	−0.000	15.864	+1.0 *x*	−1.72 *y*	+0.39 *z*	= +0.004	+0.002
	.894	− .000	.859	1.0	1.74	0.40	− .001	− .003
	.911	− .000	.876	1.0	1.74	0.40	+ .016	+ .014
	.883	− .000	.848	1.0	1.76	0.40	− .012	− .014
	.896	− .000	.861	1.0	1.78	0.40	+ .001	− .000
	.920	− .000	.885	1.0	1.78	0.40	+ .025	+ .023
	.893	+ .000	.856	1.0	1.86	0.42	− .004	− .005
	.879	+ .000	.842	1.0	1.92	0.44	− .018	− .018
C.	15.961	+0.000	15.878	+1.0 *x*	+1.91 *y*	+0.96 *z*	= +0.018	+0.024
	.935	− .000	.849	1.0	1.93	0.99	− .011	− .004
	.924	− .000	.838	1.0	1.93	0.99	− .022	− .015
	.933	− .000	.847	1.0	1.93	1.00	− .013	− .005
Assumed Mean Difference:			15.860					

Normals:

			R
+16.00 *x*	+ 1.16 *y*	+7.13 *z*	= +0.072
+ 1.16	+55.47	+1.65	= +0.102
+ 7.13	+ 1.65	+5.20	= −0.025

Solution:

	R	R	
x =	+0.0175	±0.0038	Wt. 6.20
y =	+0.0023	±0.0013	54.76
z =	−0.0295	±0.0066	2.01

$[nn] = 0.00477$ $[vv] = 0.00256$ Prob. Error 1 Eq. = ±0.″120

$x = +0.″030 \pm 0.″016$

Lalande 23361	B. D. −2°, 3528	Mag. 8.5	R. A. 12h 22.3m	Decl. −2° 31′	Pos. Angle.
a	−2°, 3517	9.0	12 18.3	−2 19	281°.8
b	−2°, 3533	8.0	12 26.8	−2 55	109°.8

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Dec. 30	10 8	3–4	7	292.655	336.844	−0.000	+0.000	629.499
1911 Jan. 4	10 5	3	8.5	.652	.845	+ .000	− .000	.497
15	9 56	3	20	.670	.856	.001	.001	.526
15	10 27	3	19	.668	.867	.001	.001	.535
1911 May 30	14 0	3–4	59.5	292.633	336.852	+0.005	−0.007	629.483
30	14 31	3–4	59	.624	.842	.005	.007	.464
June 1	15 13	3	55	.636	.872	.005	.007	.506
2	14 33	2	68.5	.630	.863	.005	.007	.491
4	13 26	3	61.5	.625	.859	.005	.007	.482
4	13 49	3	60	.624	.860	.005	.007	.482
7	13 28	2–3	62	.630	.856	.006	.007	.485
7	15 9	2–3	60	.617	.852	.006	.007	.468
1911 Dec. 30	10 30	2	18.5	292.639	336.845	+0.013	−0.016	629.481
30	10 57	2	18.5	.635	.859	.013	.016	.491
1912 Jan. 1	10 21	2	17	.613	.849	.013	.016	.459
9	10 26	1–2	8	.638	.872	.013	.016	.507
Assumed Annual Proper Motion and Mean Sum:						−0.013	+0.016	629.491

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	44.189	−0.001	44.188	$+1.0\,x - 1.93\,y - 0.00\,z = -0.018$		−0.001
	.193	− .000	.193	$1.0 \quad 1.92 \quad +0.01$	− .013	+ .004
	.186	− .002	.182	$1.0 \quad 1.83 \quad 0.04$	− .024	− .008
	.199	− .003	.194	$1.0 \quad 1.83 \quad 0.04$	− .012	+ .004
S.	44.219	+0.001	44.208	$+1.0\,x + 1.78\,y + 0.41\,z = +0.002$		−0.010
	.218	+ .002	.208	$1.0 \quad 1.78 \quad 0.41$	+ .002	− .010
	.236	− .001	.223	$1.0 \quad 1.81 \quad 0.42$	+ .017	+ .005
	.233	− .000	.221	$1.0 \quad 1.83 \quad 0.42$	+ .015	+ .003
	.234	+ .001	.223	$1.0 \quad 1.85 \quad 0.42$	+ .017	+ .005
	.236	+ .001	.225	$1.0 \quad 1.85 \quad 0.42$	+ .019	+ .007
	.226	+ .000	.213	$1.0 \quad 1.89 \quad 0.43$	+ .007	− .006
	.235	+ .002	.224	$1.0 \quad 1.89 \quad 0.43$	+ .018	+ .005
S.	44.206	+0.001	44.178	$+1.0\,x - 1.93\,y + 1.00\,z = -0.028$		−0.018
	.224	+ .000	.195	$1.0 \quad 1.93 \quad 1.00$	− .011	− .001
	.236	+ .002	.209	$1.0 \quad 1.89 \quad 1.02$	+ .003	+ .012
	.234	− .001	.204	$1.0 \quad 1.89 \quad 1.02$	− .002	+ .007
Assumed Mean Difference:	44.206					

Normals:

			R
$+16.00\,x$	$- 0.47\,y$	$+7.49\,z$	$= -0.008$
$- 0.47$	$+55.64$	-1.71	$= +0.378$
$+ 7.49$	$- 1.71$	$+5.49$	$= +0.001$

Solution:

	R	R	Wt.
$x =$	−0.0039	±0.0023	5.7
$y =$	+0.0070	±0.0007	54.5
$z =$	+0.0078	±0.0040	1.9

$[nn] = 0.00368$ $[vv] = 0.00099$ Prob. Error 1 Eq. = ±0″.070

$\pi = +0''.089 \pm 0''.009$

Lalande 24168	B. D. −9°, 3595	Mag. 7.7	R. A. 12h 51.6m	Decl. −9° 3′	Pos. Angle.
a	−8°, 3440	9.0	12 44.6	−8 54	275°.0
b	−9°, 3617	8.9	12 58.1	−9 43	112°.3

Date.			Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1911	Jan.	4	11 20	3	8	489.030	497.231	+0.001	−0.001	986.261
		5	11 31	3	13	.056	.268	.001	.001	.324
		7	11 33	3–4	25.5	.011	.211	.001	.001	.222
		9	11 39	3–4	25	.007	.234	.001	.001	.241
1911	June	7	13 57	1–2	62	489.000	497.275	+0.028	−0.027	986.276
		7	14 30	1–2	61	488.977	.270	.028	.027	.248
		9	14 26	2–3	70.5	489.001	.265	.029	.028	.267
		15	14 31	3–4	57	.027	.257	.029	.029	.284
		16	14 15	3–4	55.5	.016	.240	.029	.029	.256
		16	14 50	3–4	55	.012	.253	.029	.029	.265
		18	14 39	3–4	62.5	.015	.265	.030	.029	.281
		20	14 31	2–3	66	488.993	.268	.030	.029	.262
1912	Jan.	1	12 3	3	17.5	488.960	497.292	+0.065	−0.064	986.253
		1	12 42	3	17	.970	.303	.065	.064	.274
		21	12 11	3–4	22.5	.941	.249	.068	.067	.191
		21	13 2	3–4	22.5	.926	.284	.068	.067	.211
							Assumed Annual Proper Motion and Mean Sum:	−0.065	+0.064	986.260

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	8.201	−0.000	8.199	+1.0 *x*	−1.91 *y*	+0.01 *z*	= −0.001	−0.009
	.212	− .001	.209	1.0	1.91	0.01	+ .009	+ .001
	.200	+ .000	.198	1.0	1.91	0.02	− .002	− .010
	.227	+ .000	.225	1.0	1.90	0.02	+ .025	+ .017
C.	8.275	−0.000	8.220	+1.0 *x*	+1.75 *y*	+0.43 *z*	= +0.020	+0.021
	.293	+ .000	.238	1.0	1.75	0.43	+ .038	+ .039
	.264	− .000	.207	1.0	1.77	0.44	+ .007	+ .008
	.230	− .000	.172	1.0	1.85	0.45	− .028	− .027
	.224	+ .000	.166	1.0	1.86	0.45	− .034	− .033
	.241	− .000	.183	1.0	1.86	0.45	− .017	− .016
	.250	− .000	.191	1.0	1.87	0.46	− .009	− .008
	.275	− .000	.216	1.0	1.89	0.46	+ .016	+ .017
C.	8.332	+0.000	8.203	+1.0 *x*	−1.90 *y*	+1.00 *z*	= +0.003	+0.002
	.333	− .000	.204	1.0	1.90	1.00	+ .004	+ .003
	.308	+ .001	.174	1.0	1.83	1.05	− .026	− .027
	.358	+ .000	.223	1.0	1.83	1.05	+ .023	+ .022

Assumed Mean Difference: 8.200

Normals: +16.00 *x* − 0.49 *y* +7.73 *z* = +0.028 (R)
− 0.49 +55.14 −1.24 = −0.086
+ 7.73 − 1.24 +5.80 = +0.000

Solution: *x* = +0.0052 ±0.0061 (R) Wt. 5.67
y = −0.0017 ±0.0020 (R) 54.64
z = −0.0072 ±0.0102 (R) 2.05

$[nn] = 0.00640$ $[vv] = 0.00610$ Prob. Error 1 Eq. = ±0″.184

$\pi = -0''.021 \pm 0''.025$

Weisse	12^h, 920	B. D.	$-7°$, 3525	Mag. 8.5	R. A. $12^h\ 53.9^m$	Decl.	$-7°\ 39'$	Pos. Angle.
a			$-6°$, 3681	8.3	12 46.9		−6 49	295°.9
b			$-7°$, 3552	8.5	13 1.5		−7 44	92°.0

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1911	Jan. 17	11	7	1–2	10	540.486	543.600	+0.002	−0.002	1084.086
	17	11	37	1–2	10	.484	.600	.002	.002	.084
	18	10	54	1–2	16.5	.488	.594	.002	.002	.082
	18	11	29	1–2	16.5	.472	.583	.002	.002	.075
1911	June 8	13	40	2	66	540.450	543.587	+0.014	−0.017	1084.034
	8	14	4	2	65	.488	.617	.014	.017	.102
	9	15	0	3	69.5	.486	.623	.014	.018	.105
	17	14	55	2–3	54.5	.472	.610	.015	.018	.079
	18	15	14	3–4	62	.473	.595	.015	.018	.065
	19	14	34	2	64	.456	.596	.015	.019	.048
	19	15	5	2	64	.484	.622	.015	.019	.102
	20	15	4	3–4	66	.488	.624	.015	.019	.108
1912	Jan. 9	11	4	1–2	7	540.466	543.620	+0.033	−0.041	1084.078
	9	11	33	1–2	7	.455	.628	.033	.041	.075
	19	11	20	2	15.5	.439	.622	.034	.042	.053
	24	12	29	2	14.5	.470	.623	.034	.043	.084
							Assumed Annual Proper Motion and Mean Sum:	−0.032	+0.040	1084.076

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	3.114	−0.000	3.110	$+1.0\,x$	$-1.87\,y$	$+0.05\,z$	$= +0.011$	+0.002
	.116	− .000	.112	1.0	1.87	0.05	+ .013	+ .004
	.106	− .000	.102	1.0	1.86	0.05	+ .003	− .006
	.111	+ .000	.107	1.0	1.86	0.05	+ .008	− .001
S.	3.137	+0.000	3.106	$+1.0\,x$	$+1.72\,y$	$+0.43\,z$	$= +0.007$	+0.004
	.129	− .000	.098	1.0	1.72	0.43	− .001	− .004
	.137	− .000	.105	1.0	1.73	0.44	+ .006	+ .003
	.138	− .000	.105	1.0	1.84	0.46	+ .006	+ .003
	.122	+ .000	.089	1.0	1.85	0.46	− .010	− .013
	.140	+ .000	.106	1.0	1.86	0.47	+ .007	+ .004
	.138	− .000	.104	1.0	1.86	0.47	+ .005	+ .002
	.136	− .000	.102	1.0	1.87	0.47	+ .003	+ .000
S.	3.154	−0.000	3.080	$+1.0\,x$	$-1.90\,y$	$+1.02\,z$	$= -0.019$	−0.011
	.173	+ .000	.099	1.0	1.90	1.02	− .000	+ .008
	.183	+ .000	.107	1.0	1.85	1.05	+ .008	+ .017
	.153	− .000	.076	1.0	1.77	1.07	− .023	− .014

Assumed Mean Difference: 3.099

Normals:

			R
$+16.00\,x$	$-0.43\,y$	$+7.99\,z$	$= +0.024$
-0.43	$+53.84$	-1.51	$= +0.038$
$+7.99$	-1.51	$+5.97$	$= -0.023$

Solution:

	R	R	
$x =$	+0.0103	±0.0023	Wt. 5.3
$y =$	+0.0003	±0.0007	53.0
$z =$	−0.0176	±0.0039	1.9

$[nn] = 0.00162$ $[vv] = 0.00095$ Prob. Error 1 Eq. $= \pm 0''.068$

$\pi = +0''.004 \pm 0''.009$

Piazzi 13^h, 114	B. D. $-1°$, 2832	Mag. 7.5	R. A. $13^h\ 24.3^m$	Decl. $-1°\ 34'$	Pos. Angle.
a	$-1°$, 2817	8.5	13 17.8	−1 28	273°.6
b	$-1°$, 2847	8.0	13 31.5	−1 47	96°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	June 20	15 19	2	69	463.209	511.156	−0.037	+0.038	974.366
	20	15 54	2	69	.187	.166	.037	.038	.354
	22	14 48	3–4	75.5	.179	.167	.037	.038	.347
	22	15 36	3–4	74	.192	.183	.037	.038	.376
1911	Jan. 4	12 11	3	8.5	463.134	511.160	+0.001	−0.001	974.294
	5	12 24	2	12.5	.111	.155	.001	.001	.266
	7	12 25	2	25	.135	.149	.001	.001	.284
	15	11 32	2–3	19.5	.123	.150	.003	.003	.273
	15	12 12	2–3	18.5	.114	.144	.003	.003	.258
	16	11 36	1–2	9	.136	.160	.003	.003	.296
	16	12 19	2–3	8.5	.128	.150	.003	.003	.278
	24	12 25	2	26.5	.103	.131	.004	.004	.234
1911	June 21	14 44	2–3	63.5	463.122	511.204	+0.033	−0.033	974.326
	24	16 5	2–3	62.5	.122	.220	.034	.034	.342
	29	15 4	3	70	.103	.212	.034	.035	.314
	29	15 38	3	69.5	.120	.220	.034	.035	.339
							−0.070	+0.071	974.310

Assumed Annual Proper Motion and Mean Sum: −0.070 +0.071 974.310

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
C.	47.947	−0.003	48.019	+1.0 *x*	+1.78 *y*	−0.53 *z*	= −0.011	−0.030
	.979	− .002	.052	1.0	1.78	0.53	+ .022	+ .003
	.988	− .002	.061	1.0	1.79	0.53	+ .031	+ .012
	.991	− .003	.063	1.0	1.79	0.53	+ .033	+ .014
C.	48.026	+0.001	48.025	+1.0 *x*	−1.86 *y*	+0.01 *z*	= −0.005	+0.000
	.044	+ .002	.044	1.0	1.86	0.01	+ .014	+ .019
	.014	+ .001	.013	1.0	1.86	0.02	− .017	− .011
	.027	+ .002	.023	1.0	1.85	0.04	− .007	− .001
	.030	+ .003	.027	1.0	1.85	0.04	− .003	+ .003
	.024	+ .001	.019	1.0	1.84	0.04	− .011	− .005
	.022	+ .002	.018	1.0	1.84	0.04	− .012	− .006
	.028	+ .004	.024	1.0	1.80	0.06	− .006	+ .000
C.	48.082	−0.001	48.015	+1.0 *x*	+1.78 *y*	+0.47 *z*	= −0.015	−0.013
	.098	− .002	.028	1.0	1.81	0.48	− .002	− .000
	.109	− .000	.040	1.0	1.85	0.49	+ .010	+ .012
	.100	− .001	.030	1.0	1.85	0.49	+ .000	+ .002

Assumed Mean Difference: 48.030

Normals:

			R
+16.00 *x*	− 0.33 *y*	+0.07 *z*	= +0.021
− 0.33	+53.27	−0.72	= +0.207
+ 0.07	− 0.72	+2.06	= −0.045

Solution:

	R	R	
x =	+0.0014	±0.0021	Wt. 16.00
y =	+0.0036	±0.0012	53.01
z =	−0.0203	±0.0060	2.06

$[nn] = 0.00385$ $[vv] = 0.00215$ Prob. Error 1 Eq. = $\pm 0''.109$

$\pi = +0''.046 \pm 0''.015$

Lalande 26196	B. D. −4°, 3665	Mag. 7.6	R. A. $14^h\ 12.1^m$	Decl. −4° 29	Pos. Angle.
a	−4°, 3640	8.6	14 4.8	−4 29	269°.9
b	−4°, 3690	8.6	14 19.2	−4 31	91°.1

Date.		Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1911	Jan. 17	12	12	2	9	510.608	507.348	+0.002	−0.002	1017.956
	17	13	8	2	9	.606	.332	.002	.002	.938
	23	12	6	1–2	19	.592	.338	.002	.002	.930
	23	12	39	1–2	19	.617	.343	.002	.002	.960
1911	July 8	16	36	2–3	67	510.581	507.385	+0.026	−0.026	1017.966
	11	16	26	2–3	84.5	.605	.411	.026	.026	1018.016
	16	16	32	3	72	.607	.406	.027	.027	.023
	16	16	57	3	71	.603	.410	.027	.027	.013
	19	16	24	2	68	.576	.377	.027	.027	1017.953
	19	16	47	2	68	.572	.374	.027	.027	.946
	20	16	27	2	72	.577	.381	.027	.027	.958
	20	16	52	2	71	.582	.385	.027	.027	.967
1912	Jan. 19	11	50	2	15	510.583	507.369	+0.052	−0.052	1017.952
	19	12	13	2	15	.561	.370	.052	.052	.931
	Feb. 6	12	4	2–3	14	.577	.359	.055	.055	.936
	6	12	35	2–3	13	.558	.365	.055	.055	.923
								Assumed Annual Proper Motion and Mean Sum:	−0.050	+0.050	1017.961

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	3.260	+0.000	3.264	$+1.0\,x + 1.83\,y + 0.05\,z =$	−0.006	−0.005
	.274	+ .000	.278	1.0 1.83 0.05	+ .008	+ .009
	.254	+ .000	.258	1.0 1.85 0.06	− .012	− .012
	.274	+ .000	.278	1.0 1.85 0.06	+ .008	+ .008
S.	3.196	−0.000	3.248	$+1.0\,x - 1.81\,y + 0.52\,z =$	−0.022	−0.002
	.194	− .000	.246	1.0 1.85 0.53	− .024	− .004
	.201	− .000	.255	1.0 1.90 0.54	− .015	+ .005
	.193	− .000	.247	1.0 1.90 0.54	− .023	− .003
	.199	+ .000	.253	1.0 1.92 0.55	− .017	+ .003
	.198	+ .000	.252	1.0 1.92 0.55	− .018	+ .002
	.196	+ .000	.250	1.0 1.92 0.55	− .020	− .000
	.197	− .000	.251	1.0 1.92 0.55	− .019	+ .001
S.	3.214	+0.000	3.318	$+1.0\,x + 1.84\,y + 1.05\,z =$	+0.048	+0.008
	.191	+ .000	.295	1.0 1.84 1.05	+ .025	− .015
	.218	+ .000	.328	1.0 1.82 1.10	+ .058	+ .016
	.193	+ .000	.303	1.0 1.82 1.10	+ .033	− .009
			Assumed Mean Difference	3.270		

R

Normals: $+16.00\,x - 0.46\,y + 8.85\,z = +0.004$
$-0.46 + 55.62 + 0.03 = +0.595$
$+8.85 + 0.03 + 6.98 = +0.091$

Solution:	R	R	
$x =$	−0.0223	±0.0027	Wt. 4.8
$y =$	+0.0105	±0.0008	55.6
$z =$	+0.0413	±0.0041	2.1

$[nn] = 0.01088$ $[vv] = 0.00101$ Prob. Error 1 Eq. = ±0".076

$\pi = +0".133 \pm 0".010$

Mayer 576	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	−11°, 3770	6.0	14h 29.3m	−11° 41′	
b	−11°, 3753	8.3	14 23.5	−11 14	287°.8
	−12°, 4104	8.3	14 33.7	−12 6	110°.7

	Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1911	Jan. 30	12 51	3–4	12.5	420.022	329.484	+0.006	−0.006	749.506
	30	13 34	3–4	12	.033	.485	.006	.006	.518
	Feb. 10	13 4	1–2	25.5	.011	.496	.008	.008	.507
	10	13 36	1–2	25.5	.014	.501	.008	.008	.515
1911	June 30	15 15	2–3	71	419.993	329.548	+0.037	−0.037	749.541
	30	15 48	2–3	70	.995	.540	.037	.037	.535
	July 1	15 30	2	71	.994	.538	.038	.038	.532
	1	16 2	2	70	.990	.534	.038	.038	.524
	2	15 29	2	80	.988	.539	.038	.038	.527
	2	16 2	2	79.5	.988	.536	.038	.038	.524
	8	15 58	3	67	420.012	.545	.039	.039	.557
	10	15 58	3	81.5	419.996	.546	.040	.040	.542
1912	Feb. 6	13 26	2	12	419.956	329.564	+0.084	−0.084	749.520
	6	13 56	2	13	.970	.586	.084	.084	.556
	12	13 30	3	10	.936	.573	.085	.085	.509
	12	14 8	3	10.5	.929	.593	.085	.085	.522
	Assumed Annual Proper Motion and Mean Sum:						−0.076	+0.076	749.525

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	90.538	+0.002	90.552	$+1.0\,x + 1.96\,y + 0.08\,z =$	+0.022	+0.007
	.548	+ .001	.561	1.0 1.96 0.08	+ .031	+ .016
	.515	+ .002	.533	1.0 1.91 0.11	+ .003	− .011
	.513	+ .001	.530	1.0 1.91 0.11	+ .000	− .014
C.	90.445	−0.002	90.517	$+1.0\,x - 1.73\,y + 0.49\,z =$	−0.013	−0.012
	.455	− .001	.528	1.0 1.73 0.49	− .002	− .001
	.456	− .001	.531	1.0 1.75 0.50	+ .001	+ .002
	.456	+ .000	.532	1.0 1.75 0.50	+ .002	+ .003
	.449	− .000	.525	1.0 1.77 0.50	− .005	− .004
	.452	+ .000	.528	1.0 1.77 0.50	− .002	− .001
	.467	− .004	.541	1.0 1.86 0.51	+ .011	+ .014
	.450	− .002	.528	1.0 1.89 0.52	− .002	− .000
C.	90.392	+0.001	90.561	$+1.0\,x + 1.94\,y + 1.10\,z =$	+0.031	+0.024
	.384	− .004	.548	1.0 1.94 1.10	+ .018	+ .011
	.363	+ .002	.535	1.0 1.90 1.11	+ .005	− .002
	.336	+ .000	.506	1.0 1.90 1.11	− .024	− .031
	Assumed Mean Difference:		90.530			

Normals: $+16.00\,x + 1.17\,y + 8.81\,z = +0.076$ (R)
$+1.17 + 55.11 + 2.07 = +0.185$
$+8.81 + 2.07 + 6.93 = +0.032$

Solution: $x = +0.0084 \pm 0.0044$ (R) Wt. 4.76
$y = +0.0034 \pm 0.0013$ (R) 54.05
$z = -0.0071 \pm 0.0067$ (R) 2.04

$[nn] = 0.00367$ $[vv] = 0.00264$ Prob. Error 1 Eq. $= \pm 0''.122$

$\pi = +0''.043 \pm 0''.017$

Lalande 27744	B. D. −0°, 2944	Mag. 7.0	R. A. 15h 6.6m	Decl. −0° 47′	Pos. Angle.
a	−0°, 2936	7.8	15 2.6	−0 19	295°.0
b	−1°, 3045	7.3	15 11.5	−1 4	101°.9

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 July 29	18 9	3	71.5	312.177	359.424	−0.031	+0.038	671.608
30	17 37	2	71.5	.193	.427	.031	.037	.626
31	17 44	3	66	.189	.423	.031	.037	.618
Aug. 12	17 32	3	67.5	.166	.407	.028	.035	.580
1911 Jan. 23	12 57	1–2	18	312.165	359.454	+0.004	−0.005	671.618
23	13 31	1–2	17.5	.149	.452	.004	.005	.600
31	12 8	2–3	16	.157	.455	.006	.007	.611
31	12 38	2–3	16	.163	.466	.006	.007	.628
Feb. 2	12 44	1–2	9	.187	.475	.007	.008	.661
2	13 23	1–2	8.5	.191	.486	.007	.008	.676
4	13 38	2	32	.186	.484	.007	.009	.668
4	14 6	2	32	.182	.474	.007	.009	.654
1911 July 19	17 32	2	67	312.108	359.507	+0.040	−0.049	671.606
25	18 4	2–3	61.5	.096	.488	.041	.050	.575
29	17 24	2	68.5	.120	.505	.041	.051	.615
Aug. 8	17 48	2	72	.111	.502	.044	.053	.604
				Assumed Annual Proper Motion and Mean Sum:		−0.073	+0.089	671.622

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	47.247	+0.001	47.317	+1.0 *x*	+2.00 *y*	−0.43 *z*	=	+0.024	+0.010
	.234	− .000	.302	1.0	2.00	0.42		+ .009	− .005
	.234	+ .000	.302	1.0	2.00	0.42		+ .009	− .005
	.241	+ .003	.307	1.0	2.00	0.39		+ .014	+ .000
S.	47.289	+0.000	47.280	+1.0 *x*	−1.91 *y*	+0.06 *z*	=	−0.013	−0.002
	.303	+ .002	.296	1.0	1.91	0.06		+ .003	+ .014
	.298	+ .001	.286	1.0	1.95	0.08		− .007	+ .004
	.303	− .000	.290	1.0	1.95	0.08		− .003	+ .008
	.288	− .003	.270	1.0	1.96	0.09		− .023	− .011
	.295	− .004	.276	1.0	1.96	0.09		− .017	− .005
	.298	− .003	.279	1.0	1.96	0.10		− .014	− .002
	.292	− .002	.274	1.0	1.96	0.10		− .019	− .007
S.	47.399	+0.001	47.311	+1.0 *x*	+1.93 *y*	+0.55 *z*	=	+0.018	+0.010
	.392	+ .003	.304	1.0	1.97	0.56		+ .011	+ .003
	.385	+ .001	.294	1.0	1.99	0.57		+ .001	− .007
	.391	+ .001	.295	1.0	2.01	0.60		+ .002	− .006
	Assumed Mean Difference:		47.293						

Normals: (R)

+16.00 *x* + 0.34 *y* + 1.28 *z* = −0.005
+ 0.34 + 61.86 − 0.12 = +0.355
+ 1.28 − 0.12 + 2.04 = −0.014

Solution: (R, ″)

x = +0.0001 ±0.0014 Wt. 15.2
y = +0.0057 ±0.0007 61.8
z = −0.0064 ±0.0040 1.9

$[nn]$ = 0.00299 $[vv]$ = 0.00085 Prob. Error 1 Eq. = ±0″.069

π = +0″.072 ±0″.009

Lalande 28607	B. D. $-10°$, 4149	Mag. 7.0	R. A. $15^h\ 35.3^m$	Decl. $-10°\ 28'$	Pos. Angle.
a	$-9°$, 4180	9.0	15 29.1	− 9 59	287°.0
b	$-10°$, 4174	8.6	15 42.1	−10 37	95°.0

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	July 20	17 15	−3	63	447.982	478.307	−0.034	+0.039	926.294
	21	17 33	3	64	.994	.289	.034	.039	.288
	22	17 5	3	65.5	.984	.309	.033	.038	.298
	26	17 31	3	73.5	.993	.338	.033	.037	.335
1911	Jan. 31	13 58	2–3	15	447.989	478.412	+0.006	−0.007	926.400
	Feb. 15	14 23	3–4	6.5	.968	.391	.010	.011	.358
	22	14 6	3–4	16.5	.955	.384	.011	.012	.338
	27	14 8	3–4	20.5	.960	.388	.012	.014	.346
	28	13 46	2–3	17	.942	.380	.012	.014	.320
	28	14 19	2–3	17	.957	.387	.012	.014	.342
	Mar. 2	14 6	2	26.5	.934	.368	.013	.015	.300
	2	14 33	2	26.5	.936	.370	.013	.015	.304
1911	July 25	17 9	2–3	64.5	447.901	478.419	+0.043	−0.048	926.315
	26	17 0	1–2	64	.884	.403	.043	.049	.281
	26	17 30	1–2	63	.883	.406	.043	.049	.283
	Aug. 8	17 19	2	73	.896	.414	.046	.052	.304
							−0.076	+0.086	926.319

Assumed Annual Proper Motion and Mean Sum: −0.076 +0.086 926.319

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
S.	30.325	+0.001	30.399	$+1.0\,x + 1.80\,y - 0.45\,z =$	−0.009	+0.004
	.295	+ .001	.369	1.0 1.82 0.45	− .039	− .026
	.325	+ .001	.397	1.0 1.83 0.44	− .011	+ .002
	.345	− .001	.414	1.0 1.87 0.43	+ .006	+ .019
S.	30.423	−0.003	30.407	$+1.0\,x - 1.89\,y + 0.08\,z =$	−0.001	+0.004
	.423	− .001	.401	1.0 1.95 0.13	− .007	− .004
	.429	− .001	.405	1.0 1.92 0.14	− .003	− .000
	.428	− .001	.401	1.0 1.88 0.16	− .007	− .005
	.438	− .000	.412	1.0 1.87 0.16	+ .004	+ .006
	.430	− .000	.404	1.0 1.87 0.16	− .004	− .002
	.434	+ .001	.407	1.0 1.85 0.17	− .001	+ .001
	.434	+ .000	.406	1.0 1.85 0.17	− .002	− .000
S.	30.518	+0.000	30.427	$+1.0\,x + 1.87\,y + 0.56\,z =$	+0.019	+0.001
	.519	+ .001	.428	1.0 1.87 0.57	+ .020	+ .002
	.523	+ .001	.432	1.0 1.87 0.57	+ .024	+ .006
	.518	+ .000	.420	1.0 1.99 0.60	+ .012	− .008

Assumed Mean Difference: 30.408

Normals:

			R
+16.00 *x*	− 0.16 *y*	+1.70 *z*	= +0.001
− 0.16	+56.29	−1.05	= +0.086
+ 1.70	− 1.05	+2.29	= +0.064

Solution:

	R	R	
$x =$	−0.0032	±0.0017	Wt. 14.7
$y =$	+0.0021	±0.0009	55.8
$z =$	+0.0310	±0.0045	2.1

$[nn] = 0.00338$ $[vv] = 0.00121$ Prob. Error 1 Eq. $= \pm 0''.083$

$\pi = +0''.027 \pm 0''.011$

18 Scorpii	B. D. −7°, 4242	Mag. 5.9	R. A. 16h 7.7m	Decl. −7° 59′	Pos. Angle.
a	−7°, 4205	7.5	16 1.2	−7 50	275°.3
b	−8°, 4216	7.0	16 14.4	−8 23	103°.5

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 July 29	17	40	3	72.5	463.442	482.379	+0.009	−0.011	945.819
30	18	0	2	71	.420	.366	.008	.010	.784
31	18	9	3	66	.443	.371	.008	.010	.812
Aug. 13	17	49	2	68	.408	.353	.008	.009	.760
1911 Feb. 15	15	16	3–4	6.5	463.432	482.344	−0.003	+0.003	945.776
22	14	40	3–4	16	.426	.321	.003	.003	.747
27	14	44	3–4	20	.436	.352	.003	.004	.789
27	15	30	3–4	20	.462	.358	.003	.004	.821
Mar. 6	14	15	1–2	14	.436	.333	.004	.004	.769
6	14	46	1–2	14	.436	.352	.004	.004	.788
7	14	30	2–3	17	.426	.322	.004	.004	.748
7	15	1	2–3	16	.438	.342	.004	.004	.780
1911 Aug. 10	17	19	2–3	78.5	463.439	482.334	−0.012	+0.015	945.776
16	17	32	2–3	72.5	.461	.351	.012	.015	.815
16	17	54	2–3	72.5	.466	.370	.012	.015	.839
17	18	10	2	67.5	.488	.373	.013	.016	.864
Assumed Annual Proper Motion and Mean Sum:							+0.020	−0.025	945.793

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	18.937	−0.001	18.916	+1.0 *x*	+1.82 *y*	−0.43 *z*	= +0.000	−0.004
	.946	+ .000	.928	1.0	1.84	0.42	+ .012	+ .008
	.928	− .000	.910	1.0	1.85	0.42	− .006	− .010
	.945	+ .001	.929	1.0	1.99	0.38	+ .013	+ .008
S.	18.912	+0.000	18.918	+1.0 *x*	−1.95 *y*	+0.13 *z*	= +0.002	+0.007
	.895	+ .001	.902	1.0	1.96	0.14	− .014	− .009
	.916	+ .000	.923	1.0	1.93	0.16	+ .007	+ .012
	.896	− .001	.902	1.0	1.93	0.16	− .014	− .009
	.897	+ .000	.905	1.0	1.89	0.18	− .011	− .006
	.916	+ .000	.924	1.0	1.89	0.18	+ .008	+ .012
	.896	+ .001	.905	1.0	1.88	0.18	− .011	− .006
	.904	+ .000	.912	1.0	1.88	0.18	− .004	+ .001
S.	18.895	+0.000	18.922	+1.0 *x*	+1.97 *y*	+0.61 *z*	= +0.006	+0.001
	.890	− .000	.917	1.0	2.00	0.62	+ .001	− .004
	.904	− .001	.930	1.0	2.00	0.62	+ .014	+ .009
	.885	− .001	.913	1.0	2.00	0.63	− .003	− .008
Assumed Mean Difference:	18.916							

Normals:

			R
+16.00 *x*	+ 0.16 *y*	+2.14 *z*	= +0.000
+ 0.16	+59.24	−0.65	= +0.144
+ 2.14	− 0.65	+2.43	= −0.002

Solution:

	R	R	
x =	−0.0000	±0.0016	Wt. 14.1
y =	+0.0024	±0.0008	59.0
z =	−0.0001	±0.0041	2.1

$[nn] = 0.00136$ $[vv] = 0.00101$ Prob. Error 1 Eq. = ±0″.076

π = +0″.030 ±0″.010

Weisse 16^h, 906	B. D.	Mag.	R. A.	Decl.	Pos. Angle.
a	$-7°$, 4361	8.5	$16^h\ 42.6^m$	$-7\ 12$	304°.2
b	$-8°$, 4374	8.4	$16^h\ 54.0^m$	$-8\ 44$	112°.2

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Aug. 13	19 2	2–3	65.5	437.750	481.887	−0.009	+0.016	919.644
	17	18 45	3–4	62	.761	.891	.009	.016	.659
	30	18 52	3–4	60.5	.766	.884	.008	.014	.656
	Sept. 5	19 6	3–4	73	.759	.898	.007	.013	.663
1911	Feb. 28	15 35	2–3	17	437.819	481.914	+0.004	−0.007	919.730
	Mar. 4	14 49	3	20	.798	.878	.004	.007	.673
	4	15 21	3	18	.785	.898	.004	.007	.680
	8	14 28	2–3	24.5	.812	.889	.004	.008	.697
	8	14 58	2–3	24.5	.811	.887	.004	.008	.694
	10	14 26	2	26	.810	.895	.004	.008	.701
	10	14 53	2	26	.811	.901	.004	.008	.708
	12	14 50	1–2	20.5	.807	.895	.004	.008	.698
1911	Sept. 1	18 28	3–4	66	437.772	481.947	+0.018	−0.028	919.709
	1	18 48	3–4	66	.789	.950	.018	.028	.729
	2	18 28	3–4	72	.766	.932	.018	.028	.688
	2	18 48	3–4	71	.795	.960	.018	.028	.745
							−0.023	+0.042	919.692

Assumed Annual Proper Motion and Mean Sum: −0.023 +0.042 919.692

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	44.137	+0.002	44.164	+1.0 *x*	+1.83 *y*	−0.38 *z*	=	+0.057	+0.008
	.130	+ .002	.157	1.0	1.85	0.37		+ .050	+ .001
	.118	+ .002	.142	1.0	1.87	0.34		+ .035	− .014
	.139	+ .001	.160	1.0	1.86	0.32		+ .053	+ .005
S.	44.095	−0.002	44.082	+1.0 *x*	−1.84 *y*	+0.16 *z*	=	−0.025	+0.005
	.080	+ .001	.070	1.0	1.83	0.17		− .037	− .006
	.113	+ .001	.103	1.0	1.83	0.17		− .004	+ .027
	.077	− .000	.065	1.0	1.81	0.18		− .042	− .011
	.076	− .000	.064	1.0	1.81	0.18		− .043	− .012
	.085	− .000	.073	1.0	1.79	0.19		− .034	− .003
	.090	− .001	.077	1.0	1.79	0.19		− .030	+ .001
	.088	− .000	.076	1.0	1.77	0.19		− .031	− .000
S.	44.175	−0.001	44.128	+1.0 *x*	+1.87 *y*	+0.67 *z*	=	+0.021	+0.009
	.161	− .002	.113	1.0	1.87	0.67		+ .006	− .006
	.166	+ .000	.120	1.0	1.87	0.67		+ .013	+ .001
	.165	− .003	.116	1.0	1.87	0.67		+ .009	− .003

Assumed Mean Difference: 44.107

Normals: $+16.00\,x + 0.42\,y + 2.70\,z = -0.002$ (R)
$+0.42 + 53.91 - 0.21 = +0.897$
$+2.70 - 0.21 + 2.55 = -0.081$

Solution:

	R	R	Wt.
x =	+0.0055	±0.0020	13.1
y =	+0.0165	±0.0010	53.9
z =	−0.0361	±0.0050	2.1

$[nn] = 0.01915$ $[vv] = 0.00146$ Prob. Error 1 Eq. = $\pm 0''.091$

$\pi = +0''.210 \pm 0''.013$

Lalande 31055	B. D. −4°, 4225	Mag. 7.5	R. A. 16h 57.5m	Decl. −4° 49′	Pos. Angle.
a	−4°, 4212	8.0	16 52.3	−4 7	298°.5
b	−5°, 4412	8.3	17 3.2	−5 21	109°.1

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Aug. 13	18 21	2–3	66.5	415.894	432.672	−0.008	+0.015	848.573
	17	19 17	3–4	60	.884	.672	.008	.015	.563
	30	19 23	3–4	60	.898	.690	.007	.014	.595
	Sept. 7	19 12	3	68	.909	.696	.007	.013	.611
1911	Feb. 26	16 1	3–4	20	415.927	432.719	+0.004	−0.006	848.644
	Mar. 4	15 58	3	18	.872	.676	.004	.007	.545
	6	15 24	1–2	13	.868	.670	.004	.007	.535
	7	16 10	3	15	.862	.668	.004	.007	.527
	8	15 31	2–3	24.5	.912	.716	.004	.007	.625
	9	16 8	2	30.5	.869	.670	.004	.008	.535
	10	15 26	2	26	.892	.682	.004	.008	.570
	10	15 53	2	26	.878	.677	.004	.008	.551
1911	Sept. 1	19 11	3	65.5	415.914	432.754	+0.015	−0.027	848.656
	1	19 34	3	65	.919	.755	.015	.027	.662
	2	19 12	3–4	70	.920	.772	.015	.027	.680
	4	19 29	3	62.5	.875	.718	.015	.027	.581
							Assumed Annual Proper Motion and Mean Sum:	−0.022	+0.040	848.591

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	16.778	+0.000	16.801	+1.0 *x*	+1.86 *y*	−0.38 *z*	=	+0.005	−0.008
	.788	+ .001	.812	1.0	1.88	0.37		+ .016	+ .003
	.792	− .000	.813	1.0	1.92	0.34		+ .017	+ .004
	.787	− .000	.807	1.0	1.91	0.32		+ .011	− .001
S.	16.792	−0.001	16.781	+1.0 *x*	−1.89 *y*	+0.16 *z*	=	−0.015	−0.008
	.804	+ .001	.794	1.0	1.87	0.17		− .002	+ .005
	.802	+ .001	.792	1.0	1.86	0.18		− .004	+ .003
	.806	+ .001	.796	1.0	1.85	0.18		− .000	+ .007
	.804	− .001	.792	1.0	1.85	0.18		− .004	+ .003
	.801	+ .001	.790	1.0	1.84	0.19		− .006	+ .001
	.790	+ .000	.778	1.0	1.83	0.19		− .018	− .011
	.799	+ .001	.788	1.0	1.83	0.19		− .008	− .001
S.	16.840	−0.001	16.797	+1.0 *x*	+1.92 *y*	+0.67 *z*	=	+0.001	−0.002
	.836	− .001	.793	1.0	1.92	0.67		− .003	− .006
	.852	− .002	.808	1.0	1.92	0.67		+ .012	+ .009
	.843	+ .000	.801	1.0	1.91	0.68		+ .005	+ .002

Assumed Mean Difference: 16.796

Normals:

			R	
+16.00 *x*	+ 0.42 *y*	+2.72 *z*	=	+0.007
+ 0.42	+56.50	−0.16	=	+0.227
+ 2.72	− 0.16	+2.57	=	−0.018

Solution:

	R	R	
x =	+0.0018	±0.0011	Wt. 13.1
y =	+0.0040	±0.0005	56.5
z =	−0.0089	±0.0028	2.1

$[nn] = 0.00155$ $[vv] = 0.00048$ Prob. Error 1 Eq. = ±0.″052

$\pi = +0.''051 \pm 0.''006$

η Serpentis	B. D. $-2°$, 4599	Mag. 3.0	R. A. $18^h\ 13.8^m$	Decl. $-2°\ 56'$	Pos. Angle.
a	$-3°$, 4267	8.0	18 11.4	−3 13	244°.5
b	$-2°$, 4613	7.7	18 16.4	−2 32	58°.5

Date.	Sid. Time. h.	m.	Def.	Temp.	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1909 Oct. 16	20	8	3–4	42.5	185.278	219.790	−0.014	+0.014	405.068
17	19	56	3	44.5	.280	.806	.014	.014	.086
19	20	7	2	40	.262	.783	.013	.014	.046
20	20	13	2–3	42	.277	.794	.013	.014	.072
1910 Apr. 20	17	12	3	38.5	185.242	219.813	+0.020	−0.021	405.054
20	17	47	3	39	.261	.826	.020	.021	.086
22	17	8	3	48	.264	.832	.020	.021	.095
22	17	44	3	48	.253	.841	.020	.021	.093
26	16	57	2	42.5	.252	.824	.021	.022	.075
26	17	33	2	42	.257	.828	.021	.022	.084
27	16	23	3–4	49	.264	.832	.021	.022	.095
27	16	52	3–4	49	.248	.824	.021	.022	.071
1910 Oct. 12	19	59	2	48	185.255	219.850	+0.051	−0.053	405.103
12	20	28	2	46	.242	.863	.051	.053	.103
13	19	47	1–2	45.5	.205	.856	.051	.053	.059
13	20	16	1–2	45	.228	.869	.051	.053	.095
Assumed Annual Proper Motion and Mean Sum:							−0.065	+0.068	405.080

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	34.512	+0.001	34.541	$+1.0\,x + 1.76\,y - 0.21\,z =$	+0.011	−0.006
	.526	− .001	.553	$1.0 \quad 1.75 \quad 0.21$	+ .023	+ .006
	.521	+ .003	.551	$1.0 \quad 1.74 \quad 0.20$	+ .021	+ .004
	.517	− .001	.543	$1.0 \quad 1.73 \quad 0.20$	+ .013	− .004
C.	34.571	+0.002	34.532	$+1.0\,x - 1.72\,y + 0.30\,z =$	+0.002	+0.002
	.565	− .001	.523	$1.0 \quad 1.72 \quad 0.30$	− .007	− .007
	.568	− .001	.526	$1.0 \quad 1.70 \quad 0.30$	− .004	− .004
	.588	− .001	.546	$1.0 \quad 1.70 \quad 0.30$	+ .016	+ .015
	.572	+ .000	.529	$1.0 \quad 1.66 \quad 0.32$	− .001	− .001
	.571	− .000	.528	$1.0 \quad 1.66 \quad 0.32$	− .002	− .002
	.568	− .001	.524	$1.0 \quad 1.64 \quad 0.33$	− .006	− .006
	.576	+ .001	.534	$1.0 \quad 1.64 \quad 0.33$	+ .004	+ .004
C.	34.595	−0.002	34.489	$+1.0\,x + 1.78\,y + 0.78\,z =$	−0.041	−0.033
	.621	− .002	.515	$1.0 \quad 1.78 \quad 0.78$	− .015	− .007
	.651	+ .002	.549	$1.0 \quad 1.78 \quad 0.78$	+ .019	+ .027
	.641	− .001	.536	$1.0 \quad 1.78 \quad 0.78$	+ .006	+ .014
Assumed Mean Difference:			34.530			

Normals: $+16.00\,x + 0.66\,y + 4.80\,z =$ R $+0.039$
$+0.66 \quad +47.46 \quad -0.08 \quad = +0.060$
$+4.80 \quad -0.08 \quad +3.39 \quad = -0.038$

Solution: $x = +0.0098 \quad \pm 0.0031$ R R
$y = +0.0011 \quad \pm 0.0014$
$z = -0.0251 \quad \pm 0.0067$

Wt. 9.20
47.39
1.95

$[nn] = 0.00393 \quad [vv] = 0.00254$ Prob. Error 1 Eq. $= \pm 0''.119$

$\pi = +0''.015 \quad \pm 0''.017$

For our final value for this star see p. 377.

η Serpentis	B. D. −2°, 4599	Mag. 3.0	R. A. 18h 13.8m	Decl. −2° 56′	Pos. Angle.
c	−3°, 4263	6.5	18 9.3	−3 2	264°.4
d	−2°, 4623	8.9	18 18.8	−2 59	91°.1

Date.	Sid. Time. h.	m.	Def.	Temp. °	Distance *c*. R	Distance *d*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Oct. 1	20	55	3–4	69.5	319.436	354.623	−0.013	+0.011	674.057
2	20	47	3–4	51	.455	.600	.013	.011	.053
10	20	56	3	48.5	.446	.602	.012	.011	.047
11	21	4	2	61.5	.441	.627	.012	.011	.067
1911 Mar. 18	15	28	1–2	26.5	319.423	354.608	+0.011	−0.010	674.032
18	16	2	1–2	26	.425	.611	.011	.010	.037
18	16	40	1–2	25.5	.425	.603	.011	.010	.029
19	15	31	3–4	30.5	.423	.608	.011	.010	.032
19	16	13	3–4	30.5	.423	.613	.011	.010	.037
23	15	17	2–3	17.5	.408	.609	.011	.010	.018
23	15	57	2	17	.428	.621	.011	.010	.050
23	16	34	2	16.5	.420	.614	.011	.010	.035
1911 Oct. 13	19	55	2	46.5	319.416	354.668	+0.041	−0.036	674.089
13	20	27	2	46.5	.426	.679	.041	.036	.110
16	20	2	3–4	57	.411	.688	.041	.036	.104
16	20	35	3–4	54.5	.423	.724	.041	.036	.152
Assumed Annual Proper Motion and Mean Sum:							−0.052	+0.046	674.050

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.	R	Residuals. R
C.	35.187	−0.000	35.211	+1.0 *x* +1.98 *y* −0.25 *z* =	+0.031	+0.018
	.145	− .000	.169	1.0 1.98 0.25	− .011	− .024
	.156	+ .000	.179	1.0 1.94 0.23	− .001	− .014
	.186	− .001	.208	1.0 1.93 0.23	+ .028	+ .015
C.	35.185	+0.001	35.165	+1.0 *x* −1.97 *y* +0.21 *z* =	−0.015	−0.004
	.186	+ .001	.166	1.0 1.97 0.21	− .014	− .003
	.178	+ .001	.158	1.0 1.97 0.21	− .022	− .011
	.185	+ .001	.165	1.0 1.98 0.21	− .015	− .004
	.190	+ .001	.170	1.0 1.98 0.21	− .010	+ .001
	.201	+ .002	.182	1.0 1.97 0.22	+ .002	+ .013
	.193	+ .000	.172	1.0 1.97 0.22	− .008	+ .003
	.194	+ .001	.174	1.0 1.97 0.22	− .006	+ .005
C.	35.252	−0.002	35.173	+1.0 *x* +1.91 *y* +0.78 *z* =	−0.007	−0.016
	.253	− .003	.173	1.0 1.91 0.78	− .007	− .016
	.277	− .003	.197	1.0 1.87 0.79	+ .017	+ .008
	.301	− .005	.219	1.0 1.87 0.79	+ .039	+ .030
Assumed Mean Difference:	35.180					

Normals: $+16.00\,x - 0.39\,y + 3.89\,z = -0.001$ (R)
$-0.39 + 60.74 + 0.71 = +0.340$
$+3.89 + 0.71 + 3.06 = -0.002$

Solution: $x = +0.0008 \pm 0.0031$ (R) Wt. 11.03
$y = +0.0056 \pm 0.0013$ (R) 60.43
$z = -0.0030 \pm 0.0071$ (R) 2.10

$[nn] = 0.00496$ $[vv] = 0.00306$ Prob. Error 1 Eq. = $\pm 0''.131$

$\pi = +0''.071 \pm 0''.017$

For our final value for this star see p. 377.

Lalande 38100	B. D. −10°, 5238	Mag. 6.3	R. A. 19h 51.9m	Decl. −10° 20′	Pos. Angle.
a	−10°, 5217	8.2	19 46.6	−10 29	263°.3
b	− 9°, 5347	8.2	19 56.6	− 9 51	66°.5

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Oct. 1	21 43	3–4	68	374.215	355.976	−0.007	+0.009	730.193
	2	21 30	3–4	49	.248	.985	.007	.009	.235
	28	20 46	3–4	43.5	.207	.957	.005	.006	.165
	31	21 13	2–3	43	.194	.993	.005	.006	.188
1911	Apr. 25	17 34	2–3	39	374.196	356.009	+0.009	−0.011	730.203
	25	18 12	2–3	38	.204	355.999	.009	.011	.201
	26	17 34	1–2	38.5	.187	.984	.009	.011	.169
	26	18 11	1–2	38	.190	.989	.009	.011	.177
	28	17 30	2	48	.176	.992	.009	.011	.166
	28	18 13	2	47.5	.186	.992	.009	.011	.176
	May 3	17 34	3	32	.177	.974	.009	.012	.148
	3	18 16	3	30	.184	.965	.009	.012	.146
1911	Oct. 24	20 31	2–3	49.5	374.210	356.028	+0.023	−0.028	730.233
	24	21 11	2–3	47.5	.199	.022	.023	.028	.216
	26	21 6	2	49.5	.165	.007	.023	.029	.166
	28	20 48	3	38	.200	.027	.023	.029	.221
						Assumed Annual Proper Motion and Mean Sum:	−0.028	+0.035	730.190

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
C.	18.239	−0.000	18.223	+1.0 *x*	−1.85 *y*	−0.25 *z*	= +0.003	−0.002
	.263	− .001	.246	1.0	1.86	0.25	+ .026	+ .021
	.250	+ .001	.240	1.0	1.94	0.18	+ .020	+ .015
	.201	+ .000	.190	1.0	1.92	0.17	− .030	− .035
C.	18.187	−0.000	18.207	+1.0 *x*	+1.97 *y*	+0.31 *z*	= −0.013	−0.013
	.205	− .000	.225	1.0	1.97	0.31	+ .005	+ .005
	.203	+ .001	.224	1.0	1.97	0.31	+ .004	+ .004
	.201	+ .000	.221	1.0	1.97	0.31	+ .001	+ .001
	.184	+ .001	.205	1.0	1.96	0.32	− .015	− .015
	.194	+ .000	.214	1.0	1.96	0.32	− .006	− .006
	.203	+ .001	.225	1.0	1.92	0.33	+ .005	+ .005
	.219	+ .001	.241	1.0	1.92	0.33	+ .021	+ .021
C.	18.182	−0.001	18.232	+1.0 *x*	−1.95 *y*	+0.81 *z*	= +0.012	+0.009
	.177	− .001	.227	1.0	1.95	0.81	+ .007	+ .004
	.158	+ .001	.211	1.0	1.95	0.82	− .009	− .012
	.173	− .001	.224	1.0	1.94	0.82	+ .004	+ .001
			Assumed Mean Difference: 18.220					

Normals: $+16.00\,x + 0.28\,y + 4.95\,z = +0.035$ (R)
$+0.28 + 60.07 + 0.21 = -0.061$
$+4.95 + 0.21 + 3.65 = +0.006$

Solution:

	R	R	Wt.
x =	+0.0029	±0.0030	9.29
y =	−0.0010	±0.0013	60.07
z =	−0.0023	±0.0072	2.12

$[nn] = 0.00321$ $[vv] = 0.00307$ Prob. Error 1 Eq. = ±″0.131

$\pi = -″0.013 \pm ″0.017$

Lalande 45028	B. D. −4°, 5804	Mag. 7.8	R. A. 22h 54.3m	Decl. −4° 37′	Pos. Angle.
a	−5°, 5903	8.0	22 52.2	−5 8	225°.7
b	−4°, 5815	8.9	22 57.2	−4 16	63°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum R
1910	Dec. 3	0 50	2–3	25	211.062	223.261	+0.001	−0.002	434.322
	4	0 30	2–3	26	.047	.278	.001	.002	.324
	8	1 18	3–4	24	.060	.260	.001	.001	.320
	9	1 10	3	13	.048	.279	.001	.001	.327
1911	June 16	20 25	3–4	52	211.089	223.290	−0.005	+0.010	434.384
	17	20 24	2	50.5	.080	.283	.005	.010	.368
	19	20 20	3–4	63.5	.081	.286	.005	.010	.372
	19	20 45	3–4	62	.078	.282	.005	.010	.365
	20	20 25	2–3	56	.080	.289	.005	.010	.374
	20	20 47	2–3	56	.067	.269	.005	.010	.341
	21	20 28	3–4	56.5	.066	.269	.005	.010	.340
	28	20 30	3–4	67.5	.045	.252	.005	.011	.303
1911	Nov. 30	0 32	2	31	211.060	223.274	−0.009	+0.020	434.345
	30	0 57	2	31	.057	.279	.009	.020	.347
	Dec. 2	0 45	2	33	.074	.277	.009	.020	.362
	2	1 4	2	32.5	.059	.280	.009	.020	.350
							Assumed Annual Proper Motion and Mean Sum:	+0.010	−0.022	434.346

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				R	Residuals. R
S.	12.199	+0.001	12.197	+1.0 *x*	+1.91 *y*	−0.08 *z*	=	−0.029	−0.016
	.231	+ .001	.229	1.0	1.91	0.07		+ .003	+ .016
	.200	+ .001	.199	1.0	1.90	0.06		− .027	− .014
	.231	+ .001	.230	1.0	1.90	0.06		+ .004	+ .017
S.	12.201	−0.001	12.215	+1.0 *x*	−1.92 *y*	+0.46 *z*	=	−0.011	−0.004
	.203	− .001	.217	1.0	1.91	0.46		− .009	− .002
	.205	− .001	.219	1.0	1.90	0.47		− .007	− .000
	.204	− .001	.218	1.0	1.90	0.47		− .008	− .001
	.209	− .001	.223	1.0	1.89	0.47		− .003	+ .004
	.202	+ .000	.217	1.0	1.89	0.47		− .009	− .002
	.203	+ .000	.218	1.0	1.88	0.47		− .008	− .001
	.207	+ .001	.224	1.0	1.80	0.49		− .002	+ .004
S.	12.214	+0.000	12.243	+1.0 *x*	+1.90 *y*	+0.91 *z*	=	+0.017	−0.001
	.222	− .000	.251	1.0	1.90	0.91		+ .025	+ .007
	.203	− .000	.232	1.0	1.91	0.92		+ .006	− .013
	.221	− .000	.250	1.0	1.91	0.92		+ .024	+ .005

Assumed Mean Difference: 12.226

Normals:

			R
+16.00 *x*	+ 0.15 *y*	+7.15 *z*	= −0.034
+ 0.15	+57.51	−0.60	= +0.152
+ 7.15	− 0.60	+5.13	= +0.045

Solution:

	R	R	
x =	−0.0165	±0.0027	Wt. 6.0
y =	+0.0030	±0.0009	57.3
z =	+0.0322	±0.0049	1.9

$[nn] = 0.00359$ $[vv] = 0.00130$ Prob. Error 1 Eq. = ±0″.086

$\pi = +0''.038 \pm 0''.011$

Lalande 45292–4	B. D. −3°, 5577	Mag. 8.2	R. A. $23^h\ 1.6^m$	Decl. −3° 2′	Pos. Angle.
a	−3°, 5553	7.8	22 54.5	−3 28	256°.7
b	−2°, 5918	7.9	23 9.3	−2 37	77°.3

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910	Dec. 3	1 14	2–3	25	524.293	553.462	+0.003	−0.003	1077.755
	4	1 0	2–3	26	.332	.472	.003	.003	.804
	7	0 31	3	18.5	.296	.443	.003	.003	.739
	8	0 44	3–4	25	.294	.443	.003	.003	.737
1911	June 16	20 56	3–4	52	524.355	553.446	−0.019	+0.019	1077.801
	19	21 8	3–4	61	.356	.455	.020	.020	.811
	20	21 10	2–3	56	.341	.437	.020	.020	.778
	21	20 56	3–4	56.5	.367	.447	.020	.020	.814
	21	21 16	3–4	56.5	.326	.434	.020	.020	.760
	28	21 16	3–4	66.5	.362	.440	.021	.021	.802
	29	20 30	3–4	63	.369	.456	.021	.021	.825
	29	20 57	3–4	63	.386	.473	.021	.021	.859
1911	Nov. 26	0 49	3	35.5	524.381	553.436	−0.038	+0.038	1077.817
	26	1 16	3	35	.390	.448	.038	.038	.838
	27	0 17	2–3	38.5	.382	.439	.038	.038	.821
	30	1 21	2	31	.379	.446	.038	.038	.825
	Assumed Annual Proper Motion and Mean Sum:						+0.042	−0.042	1077.799

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	29.169	+0.001	29.164	+1.0 *x*	+1.94 *y*	−0.08 *z*	= +0.028	+0.017
	.140	− .000	.134	1.0	1.94	0.07	− .002	− .013
	.147	+ .002	.143	1.0	1.93	0.07	+ .007	− .004
	.149	+ .002	.145	1.0	1.93	0.06	+ .009	− .002
S.	29.091	−0.000	29.129	+1.0 *x*	−1.96 *y*	+0.46 *z*	= −0.007	−0.002
	.099	− .000	.139	1.0	1.94	0.47	+ .003	+ .008
	.096	+ .001	.137	1.0	1.93	0.47	+ .001	+ .006
	.080	− .000	.120	1.0	1.92	0.47	− .016	− .011
	.108	+ .001	.149	1.0	1.92	0.47	+ .013	+ .018
	.078	− .000	.120	1.0	1.84	0.49	− .016	− .011
	.087	− .001	.128	1.0	1.83	0.49	− .008	− .003
	.087	− .002	.127	1.0	1.83	0.49	− .009	− .004
S.	29.055	−0.000	29.131	+1.0 *x*	+1.92 *y*	+0.90 *z*	= −0.005	−0.003
	.058	− .001	.133	1.0	1.92	0.90	− .003	− .001
	.057	− .001	.132	1.0	1.92	0.91	− .004	− .002
	.067	− .001	.142	1.0	1.93	0.91	+ .006	+ .008
	Assumed Mean Difference:		29.136					

R

Normals: +16.00 *x* + 0.26 *y* +7.15 *z* = −0.003
+ 0.26 +58.54 −0.81 = +0.141
+ 7.15 − 0.81 +5.11 = −0.029

Solution:

	R	R	
x =	+0.0058	±0.0027	Wt. 6.0
y =	+0.0022	±0.0009	58.1
z =	−0.0136	±0.0048	1.9

$[nn] = 0.00189$ $[vv] = 0.00125$ Prob. Error 1 Eq. = ±0.″084

$\pi = +0.''028 \pm 0.''011$

Lalande 45456	B. D. −9°, 6150	Mag. 9.0	R. A. 23h 6.5m	Decl. −9° 43′	Pos. Angle.
a	−9°, 6128	8.5	23 0.9	−9 47	266°.8
b	−9°, 6171	8.0	23 13.1	−9 43	89°.7

Date.		Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1910 Dec.	3	0 13	2–3	25	394.922	461.140	+0.003	−0.004	856.061
	4	0 1	2–3	26.5	.906	.113	.003	.003	.019
	8	0 12	3–4	26.5	.912	.126	.003	.003	.038
	9	0 40	3	14	.904	.102	.003	.003	.006
1911 June	28	21 46	3–4	65	394.945	461.107	−0.021	+0.022	856.053
	29	21 26	3–4	62	.945	.127	.021	.022	.073
July	2	21 31	3	73	.953	.123	.022	.022	.076
	2	21 53	3	73	.948	.109	.022	.022	.057
	4	21 25	2	73.5	.968	.136	.022	.022	.104
	4	21 51	2	73.5	.958	.109	.022	.022	.067
	5	21 36	2–3	72.5	.962	.138	.022	.022	.100
	5	22 2	2–3	72.5	.987	.137	.022	.022	.124
1911 Dec.	5	0 43	2	28	394.939	461.062	−0.040	+0.041	856.002
	5	1 5	2	28	.919	.060	.040	.041	855.980
	6	0 6	1–2	34	.934	.066	.040	.041	856.001
	6	0 25	1–2	34	.930	.048	.040	.041	855.979
						Assumed Annual Proper Motion and Mean Sum:	+0.043	−0.044	856.046

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.				Residuals. R
S.	66.218	−0.001	66.210	+1.0 *x*	+1.82 *y*	−0.08 *z*	= +0.003	+0.006
	.207	+ .002	.203	1.0	1.82	0.07	− .004	− .001
	.214	+ .001	.209	1.0	1.81	0.06	+ .002	+ .005
	.198	+ .003	.195	1.0	1.81	0.06	− .012	− .009
S.	66.162	−0.001	66.204	+1.0 *x*	−1.76 *y*	+0.49 *z*	= −0.003	−0.002
	.182	− .002	.223	1.0	1.75	0.49	+ .016	+ .017
	.170	− .002	.212	1.0	1.70	0.50	+ .005	+ .006
	.161	− .001	.204	1.0	1.70	0.50	− .003	− .002
	.168	− .004	.208	1.0	1.68	0.51	+ .001	+ .002
	.151	− .002	.193	1.0	1.68	0.51	− .014	− .013
	.176	− .004	.216	1.0	1.66	0.51	+ .009	+ .010
	.150	− .006	.188	1.0	1.66	0.51	− .019	− .018
S.	66.123	+0.003	66.207	+1.0 *x*	+1.82 *y*	+0.93 *z*	= +0.000	−0.007
	.141	+ .005	.227	1.0	1.82	0.93	+ .020	+ .013
	.132	+ .003	.216	1.0	1.82	0.93	+ .009	+ .002
	.118	+ .005	.204	1.0	1.82	0.93	− .003	− .010

Assumed Mean Difference: 66.207

Normals: +16.00 *x* + 0.95 *y* +7.47 *z* = +0.007 R
+ 0.95 +49.51 −0.58 = +0.040
+ 7.47 − 0.58 +5.51 = +0.021

Solution: *x* = −0.0039 ±0.0030 R R Wt. 5.8
y = +0.0010 ±0.0010 48.9
z = +0.0095 ±0.0050 2.0

$[nn] = 0.00160$ $[vv] = 0.00139$ Prob. Error 1 Eq. = ±0″.089

$\pi = +0''.013 \pm 0''.013$

§ 4. η Serpentis — Final Value.

The two values found for the parallax of this star, after an additional error of ±0″.006 has been compounded with the probable error of the second for the change which took place on Feb. 4, 1911 (v. p. 332), are: —

Series I:	π = +0″.015	±0″.017	Wt. 47.4	Prob. Error 1 Obs.	±0″.119	16 Obs.
" II:	π = +0.071	±0.018	60.4		±0.131	16

These two series, taken by themselves, would indicate a decidedly larger systematic error than was shown for Chase from his other duplicate series, but in those series the results were derived from a much larger number of observations. As explained later, we assume in this work the probable error for a single series, including the systematic error, to be on the average ±0″.020, instead of ±0″.014 for Chase, as taken on page 215. Combining the above results in the manner described on the page cited, we have: —

Method α:	π = +0″.043	±0″.014
" β:	π = +0.046	±0.012
" γ:	π = +0.041	±0.012

Taking the mean of these we have for our adopted and final value: —

η Serpentis: π = + 0″.043 ± 0″.013

§ 5. B. D. + 58°, 2605 — New Series and Final Value.

The discordant parallax values for this star found on pages 313–314, where the observations were divided into two groups led, to the execution of a new series with a better pair of comparison stars, the observations and results for which follow: —

B. D. + 58°, 2605	B. D. + 58°, 2605	Mag. 7.5	R. A. 23h 24.3m	Decl. +58° 20′	Pos. Angle.
a	+ 57°, 2723	8.2	23 13.9	+57 43	245°.4
b	+ 58°, 2629	8.2	23 34.1	+58 36	79°.5

Date.	Sid. Time. h. m.	Def.	Temp. °	Distance *a*. R	Distance *b*. R	P. M. Corrections. R	R	Corrected Sum. R
1909 Dec. 17	5 44	3	26.5	437.321	365.126	+0.004	−0.004	802.447
18	5 22	2–3	21.5	.318	.140	.003	.003	.458
19	5 4	3	21.5	.318	.120	.003	.003	.438
20	5 12	3	17	.296	.100	.003	.003	.396
21	5 10	3	21	.312	.131	.003	.003	.443
24	5 26	3	23	.304	.122	.002	.002	.426
1910 June 7	17 53	2–3	49	437.376	365.078	−0.040	+0.040	802.454
7	18 20	2–3	48.5	.354	.066	.040	.040	.420
24	17 22	3	58	.341	.057	.045	.045	.398
24	17 47	3	57.5	.362	.060	.045	.045	.422
28	17 42	3–4	68	.373	.056	.046	.046	.429
28	18 8	3–4	67	.388	.066	.046	.046	.454
July 4	18 19	3–4	63	.364	.084	.047	.047	.448
5	17 31	3–4	63.5	.379	.057	.047	.047	.436
5	17 58	3–4	62.5	.380	.068	.047	.047	.448
6	17 30	3–4	64	.378	.096	.047	.047	.474
6	17 58	3–4	63	.369	.066	.047	.047	.435
7	17 39	2	66.5	.372	.070	.047	.047	.442

B. D. +58°, 2605 — *continued.*

1910	Dec. 24	4 52	2	29.5	437.400	365.021	−0.091	+0.091	802.421
	25	4 47	2	18	.377	.007	.091	.091	.384
	25	5 22	2	17	.383	.009	.091	.091	.392
	27	4 8	1–2	28	.420	.033	.092	.092	.453
	27	4 35	1–2	27	.432	.045	.092	.092	.477
	28	4 29	2	35	.432	.050	.092	.092	.482

Assumed Annual Proper Motion and Mean Sum: +0.093 −0.093 802.436

Observer.	Difference. R	Scale Value Correction. R	Corrected Difference. R	Equations of Condition.			R	Residuals. R
S.	72.195	−0.001	72.202	+1.0 x	−1.83 y	−0.04 z =	−0.001	+0.007
	.178	− .001	.183	1.0	1.83	0.03	− .020	− .012
	.198	− .000	.204	1.0	1.84	0.03	+ .001	+ .009
	.196	+ .004	.206	1.0	1.84	0.03	+ .003	+ .011
	.181	− .001	.186	1.0	1.84	0.03	− .017	− .009
	.182	+ .001	.187	1.0	1.86	0.02	− .016	− .007
S.	72.298	−0.002	72.216	+1.0 x	+1.82 y	+0.43 z =	+0.013	+0.006
	.288	+ .001	.209	1.0	1.82	0.43	+ .006	− .001
	.284	+ .003	.197	1.0	1.92	0.48	− .006	− .013
	.302	+ .001	.213	1.0	1.92	0.48	+ .010	+ .003
	.317	+ .001	.226	1.0	1.92	0.49	+ .023	+ .016
	.322	− .002	.228	1.0	1.92	0.49	+ .025	+ .018
	.280	− .001	.185	1.0	1.91	0.51	− .018	− .025
	.322	+ .000	.228	1.0	1.91	0.51	+ .025	+ .018
	.312	− .001	.217	1.0	1.91	0.51	+ .014	+ .007
	.282	− .003	.185	1.0	1.90	0.51	− .018	− .025
	.303	+ .000	.209	1.0	1.90	0.51	+ .006	− .001
	.302	− .001	.207	1.0	1.90	0.51	+ .004	− .003
S.	72.379	+0.001	72.198	+1.0 x	−1.86 y	+0.98 z =	−0.005	+0.001
	.370	+ .005	.193	1.0	1.86	0.98	− .010	− .004
	.374	+ .004	.196	1.0	1.86	0.98	− .007	− .001
	.387	− .002	.201	1.0	1.86	0.99	− .002	+ .004
	.387	− .004	.199	1.0	1.86	0.99	− .004	+ .002
	.382	− .004	.194	1.0	1.86	0.99	− .009	− .003

Assumed Mean Difference: 72.203

			R		R	R	
Normals:	+24.00 x	+ 0.55 y	+11.59 z = −0.003	*Solution:* x =	−0.0012	±0.0028	Wt. 8.5
	+ 0.55	+84.25	+ 0.46 = +0.332	y =	+0.0039	±0.0009	84.2
	+11.59	+ 0.46	+ 8.68 = +0.006	z =	+0.0021	±0.0046	3.1

$[nn]$ = 0.00433 $[vv]$ = 0.00300 Prob. Error 1 Eq. = ±0″.102

π = +0″.050 ±0″.011

The earlier result and that found above brought together are: —

Series I:	π = +0″.099	±0″.020	Wt. 54.5	Prob. Error 1 Obs.	±0″.175	31 Obs.
" II:	π = +0.050	±0.011	84.2		±0.102	24

These combined in the adopted manner (v. pp. 215-216) taking, however, in Method α the value ±0″.020, as above for η Serpentis, give: —

Method α: π = +0″.075 ±0″.014
" β: π = +0.069 ±0.012
" γ: π = +0.061 ±0.010

the mean of which is our final value: —

B. D. +58°, 2605: π = +0″.068 ±0″.012

§ 6. Discussion and Final Results.

As in our previous parallax investigations we have attributed equal weights to all of the observations for all qualities of definition. As a further test of the validity of this assumption we have classified the residuals in the present work, thereby deriving the following tables: —

Chase.	Def. 1 & 1–2.	No. Obs.	Def. 2.	No. Obs.	Def. 2–3.	No. Obs.	Def. 3.	No. Obs.	Def. 3–4.	No. Obs.
	R		R		R		R		R	
Class I	0.0164	5	0.0095	9	0.0060	6	0.0135	14	0.0150	15
" II	0.0076	10	0.0112	28	0.0102	24	0.0092	23	0.0096	36
" III	0.0108	10	0.0119	38	0.0105	38	0.0096	45	0.0159	39

Smith.	Def. 1 & 1–2.	No. Obs.	Def. 2.	No. Obs.	Def. 2–3.	No. Obs.	Def. 3.	No. Obs.	Def. 3–4.	No. Obs.
	R		R		R		R		R	
Class I	0.0094	8	0.0062	19	0.0068	13	0.0062	15	0.0059	9
" II	0.0071	8	0.0073	19	0.0059	17	0.0073	18	0.0068	18
" III	0.0056	23	0.0063	62	0.0067	42	0.0069	44	0.0078	45

Where Class I signifies that main star and both comparison stars are as bright as magnitude 8.0
" II " " " " " " one " star " " " " " "
" III " " " " or both " stars are fainter than " "

From these tables there is apparent no marked inferiority in the degree of accuracy, except for Class I under the best seeing conditions, which seems absurd, and moreover the number of observations was too small to be convincing; and for Class III under the worst seeing conditions, particularly for Chase, which accords with earlier experience. However, as there were only one or two stars for which the good and bad qualities of definition were not fairly evenly distributed, it was not deemed expedient to treat the equations of condition with different weights.

The following table gives the collected data and final results of the present investigation in the same form as our previously published lists (pp. 196–198 and 322), except that under "Spectrum" is given the "Harvard Revised" determination when that is known.

In the probable errors given, we have made allowance for a possible systematic error in the manner described on pp. 215–216, assuming in Method α the liberal value of $\pm 0''.020$ for both observers, the slightly larger value there given for Smith having been based partly upon observations of difficult double stars. There were no such in this list. For Method β we have based the probable errors upon the average probable error of one observation for each observer from his twenty-one series, compounded with $\pm 0''.006$ for all series not completed before the change described on pages 332–333 took place. And for Method γ we have taken the probable error resulting from the solution, likewise compounded with $\pm 0''.006$.

Collected Final Results.

Page.	Star.	Magnitude. B.D.	H.R.	D.C.	Spect.	R. A. 1900.0 h m	Decl. ° ′	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Obs.
334	Weisse 1^h, 161	8.0	—	—	Ko	1 13.5	− 1 23	+0.028	−0.26	0.49	−0.020	±0.020	C. 16
335	Lalande 2387	8.5	—	—	G	14.0	− 9 27	−0.021	−0.50	0.59	+0.016	0.020	C. 14
336	Lalande 3922–3	7.5	—	6.5	Go	2 2.5	− 1 5	−0.024	−0.36	0.51	−0.048	0.020	C. 14
337	Weisse 2^h, 95	8.3	—	—	G	9.5	− 1 40	+0.065	−0.08	0.97	+0.008	0.022	C. 14
338	Lalande 6320	7.9	—	—	K5	3 20.1	− 5 42	−0.019	−0.80	0.85	+0.061	0.016	S. 16
339	ϵ Eridani	3.3	3.8	4.8	Kp	28.2	− 9 48	−0.067	+0.01	0.99	+0.307	0.014	S. 16
340	Weisse 3^h, 617	7.2	—	—	F8	35.3	− 3 32	+0.050	−0.23	0.78	−0.080	0.015	S. 16
341	δ Eridani	3.3	3.7	4.8	Ko	38.5	−10 6	−0.008	+0.74	0.75	+0.181	0.015	S. 16
342	Weisse 4^h, 1189	6.3	6.5	—	Ko	4 55.9	− 5 52	+0.040	−1.10	1.25	+0.104	0.015	S. 16
343	Lalande 9960–1	8.5	—	—	Ko	5 14.1	− 3 11	+0.045	+0.13	0.68	+0.067	0.015	S. 16
344	Lalande 10299	8.5	—	—	Ko	23.5	− 3 34	−0.020	−0.82	0.87	+0.093	0.014	S. 16
345	δ Orionis	Var.	2.5	—	Bo	26.9	− 0 22	0.000	−0.00	0.00	−0.076	0.014	S. 16
346	ϵ Orionis	2.0	1.8	—	Bo	31.1	− 1 16	+0.000	−0.00	0.00	−0.024	0.018	C. 16
347	ζ Orionis	2	2.1	—	Bo	35.7	− 2 0	+0.000	−0.01	0.01	−0.020	0.018	C. 16
348	κ Orionis	2.5	2.2	—	Bo	43.0	− 9 42	+0.000	−0.00	0.00	+0.023	0.019	C. 16
349	Lalande 13284–5	6.9	—	—	Ko	6 47.4	− 5 3	−0.038	+0.03	0.57	+0.114	0.018	C. 16
350	Lalande 14146	7.3	—	—	Go	7 11.3	−12 53	−0.037	+0.16	0.56	+0.072	0.020	C. 17
351	Lalande 16304	6.3	6.0	5.9	Go	8 13.7	−12 18	+0.017	−0.98	1.01	+0.095	0.017	C. 16
353	α Hydrae	2	2.2	4.2	K2	9 22.7	− 8 14	−0.001	+0.03	0.03	+0.008	0.017	C. 25
354	Weisse 10^h, 520	5.7	5.9	6.2	F5	10 31.6	−11 42	+0.016	−0.63	0.67	+0.008	0.020	C. 16
355	Piazzi 11^h, 32	7.2	—	6.8	K	11 13.2	− 4 31	+0.050	−0.12	0.76	−0.000	0.021	C. 16
356	Lalande 22585	6.4	5.6	6.0	G5	55.6	− 9 53	+0.009	−0.45	0.47	+0.111	0.015	S. 16
357	Lalande 22701	8.4	—	—	G	12 0.1	− 0 57	−0.035	+0.05	0.53	+0.104	0.016	S. 16
358	Weisse 12^h, 69	7.3	—	—	Go	7.4	− 2 32	−0.040	+0.43	0.74	−0.010	0.020	C. 16
359	Lalande 22954–68	6.2	6.1	6.1	F5	10.0	− 9 44	+0.003	−0.98	0.98	+0.030	0.019	C. 16
360	Lalande 23361	8.5	—	—	Go	24.6	− 2 46	−0.023	−0.66	0.74	+0.089	0.015	S. 16
361	Lalande 24168	7.7	—	—	Go	53.9	− 9 18	−0.058	+0.18	0.88	−0.021	0.022	C. 16
362	Weisse 12^h, 920	8.5	—	—	Go	56.2	− 7 54	−0.036	−0.13	0.55	+0.004	0.015	S. 16
363	Piazzi 13^h, 114	7.5	—	—	G	13 26.6	− 1 49	−0.060	+0.27	0.94	+0.046	0.018	C. 16
364	Lalande 26196	7.6	—	—	G5	14 14.4	− 4 41	−0.045	−0.09	0.68	+0.133	0.015	S. 16
365	Mayer 576	6.0	6.2	6.5	F5	31.7	−11 53	−0.061	+0.38	0.97	+0.043	0.019	C. 16
366	Lalande 27744	7.0	—	6.5	Go	15 8.8	− 0 58	−0.086	−0.50	1.38	+0.072	0.014	S. 16
367	Lalande 28607	7.0	—	—	F5	37.7	−10 36	−0.079	−0.30	1.20	+0.027	0.015	S. 16
368	18 Scorpii	5.9	5.6	5.9	Go	16 10.2	− 8 6	+0.013	−0.50	0.53	+0.030	0.015	S. 16
369	Weisse 16^h, 906	8.8	—	—	K	50.1	− 8 9	−0.063	−0.89	1.29	+0.210	0.016	S. 16
370	Lalande 31055	7.5	—	—	K5	59.8	− 4 54	−0.065	−1.13	1.49	+0.051	0.014	S. 16
377	η Serpentis	3	3.4	4.6	Ko	18 16.1	− 2 55	−0.040	−0.68	0.91	+0.043	0.013	C. 32
373	Lalande 38100	6.3	5.9	—	F8	19 54.4	−10 13	−0.022	−0.37	0.49	−0.013	0.018	C. 16
374	Lalande 45028	7.8	—	—	Ko	22 56.7	− 4 23	+0.029	−0.26	0.50	+0.038	0.015	S. 16
375	Lalande 45292–4	8.2	—	—	Ko	23 4.0	− 2 48	+0.037	−0.10	0.56	+0.028	0.015	S. 16
376	Lalande 45456	9.0	—	—	F5	8.9	− 9 29	+0.036	−0.05	0.53	+0.013	0.016	S. 16
378	B. D. +58°, 2605	7.5	—	6. 6	Ko	26.4	+58 37	+0.138	+0.08	1.08	+0.068	0.012	S. 48

§ 6. General Conclusions.

In the collected final results just given it will be noticed that Smith's values are on the average larger than those of Chase. But it happens that in his list are included most of the stars possessing the largest proper motions, and it is very doubtful if there is any considerable systematic difference between the two observers, as is shown by their duplicated series on Groombridge 1830, Arcturus and χ Cygni. In fact in the last two cases the difference was small and in the opposite direction, while there was almost perfect agreement in the first.

The comparison stars used in this investigation have all been pretty thoroughly investigated for proper motion. An annual motion of approximately 0.″10, or exceeding that amount, was found in the following cases: —

Lalande 2387, *a*	B. D. − 9°, 237	Mag. 8.0	P. M. 0.″34
Lalande 3922–3, *a*	− 1°, 282	8.8	0.25
Lalande 3922–3, *b*	− 0°, 329	8.5	0.10
Weisse 2^h, 95, *a*	− 2°, 374	8.9	0.14
δ Eridani, *a*	−10°, 708	8.6	0.10
Weisse 4^h, 1189, *b*	− 5°, 1156	8.0	0.08
Lalande 9960–1, *a*	− 3°, 1042	7.7	0.15
Lalande 10299, *b*	− 3°, 1146	7.0	0.12 ?
ζ Orionis, *b*	− 1°, 1019	8.6	0.17
Lalande 13284–5, *b*	− 5°, 1882	8.5	0.09
Lalande 14146, *a*	−12°, 1809	7.5	0.16
Lalande 24168–9, *b*	− 7°, 3552	8.5	0.10
Lalande 26196, *a*	− 4°, 3640	8.6	0.13
Lalande 27744, *b*	− 1°, 3045	7.3	0.13
Lalande 38100, *b*	− 9°, 5347	8.2	0.11
Lalande 45292–4, *b*	− 2°, 5918	7.9	0.09

For the present we prefer not to attempt to deduce the absolute parallaxes, but should they be desired the results for Lalande 2387, where one, and Lalande 3922–3, where both comparison stars are seen to possess a considerable proper motion, would have to be increased materially more than the values for the remaining stars of the list.

The same remark would apply also to Lalande 19896 and Weisse 20^h, 1454 of our list of 35 selected stars (pp. 322–323), and this possibly explains to a large extent the negative values found for those stars.

The table given on page 324 should now be supplemented by adding the following:—

Results for 41 Southern Stars arranged according to Proper Motion and Magnitude.

P. M.: 0.″00 – 0.″34				P. M.: 0.″41 – 0.″54				P. M.: 0.″55 – 0.″65				P. M.: 0.″66 – 0.″96				P. M.: 0.″97 – 7.″04			
Page.	Mag.	P. M.	Par.	Page.	Mag.	P. M.	Par.	Page.	Mag.	P. M.	Par.	Page.	Mag.	P. M.	Par.	Page.	Mag.	P. M.	Par.
Mag. 0.0 – 2.5				Mag. 0.0 – 2.5				Mag. 0.0 – 2.5				Mag. 0.0 – 2.5				Mag. 0.0 – 2.5			
		″	″																
345	Var.	0.00	−0.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
346	2.0	0.00	−0.02																
347	2	0.01	−0.02																
348	2.5	0.00	+0.02	Mag. 3.0 – 5.0				Mag. 3.0 – 5.0				Mag. 3.0 – 5.0				Mag. 3.0 – 5.0			
353	2	0.03	+0.01																
				—	—	—	—	—	—	—	—			″	″			″	″
5 st.	2.2	0.01	−0.018									341	3.3	0.75	+0.18	339	3.3	0.99	+0.31
												377	3.0	0.91	+0.04				
Mag. 3.0 – 5.0				Mag. 5.1 – 7.0				Mag. 5.1 – 7.0				2 st.	3.1	0.83	+0.110				
						″	″			″	″								
—	—	—	—	356	6.4	0.47	+0.11	349	6.9	0.57	+0.11	Mag. 5.1 – 7.0				Mag. 5.1 – 7.0			
				368	5.9	0.53	+0.03												
				373	6.3	0.49	−0.01					354	5.7	0.67	+0.01	342	6.3	1.25	+0.10
																351	6.3	1.01	+0.09
Mag. 5.1 – 7.0.				3 st.	6.2	0.50	+0.043									359	6.2	0.98	+0.03
																365	6.0	0.97	+0.04
																366	7.0	1.38	+0.07
—	—	—	—	Mag. 7.1 – 9.0				Mag. 7.1 – 9.0				Mag. 7.1 – 9.0				367	7.0	1.20	+0.03
				334	8.0	0.49	−0.02	335	8.5	0.59	+0.02	338	7.9	0.85	+0.06				
Mag. 7.1 – 9.0				336	7.5	0.51	−0.05	350	7.3	0.56	+0.07	340	7.2	0.78	−0.08	6 st.	6.5	1.14	+0.060
—	—	—	—	357	8.4	0.53	+0.10	362	8.5	0.55	+0.00	343	8.5	0.68	+0.07				
				374	7.8	0.50	+0.04	375	8.2	0.56	+0.03	344	8.5	0.87	+0.09				
				376	9.0	0.53	+0.01					355	7.2	0.76	−0.00				
								4 st.	8.1	0.56	+0.030	358	7.3	0.74	−0.01				
				5 st.	8.1	0.51	+0.016					360	8.5	0.74	+0.09	Mag. 7.1. – 9.0			
												361	7.7	0.88	−0.02	337	8.3	0.97	+0.01
												363	7.5	0.94	+0.05	369	8.8	1.29	+0.21
												364	7.6	0.68	+0.13	370	7.5	1.49	+0.05
												10 st.	7.8	0.79	+0.038	3 st.	8.2	1.25	+0.090

Incorporating this table with that given on page 324 after the latter has been corrected to correspond with the revised proper motions given in our catalogue at the end of this volume, and after the substitution of the newly determined value for B. D. + 58°, 2605, we derive the following condensed table:—

Averages of Parallax Results for 238 Stars.

Proper Motion.	0.″00 — 0.″34		0.″41 — 0.″54		0.″55 — 0.″65		0.″66 — 0.″96		0.″97 — 7.″04	
	″		″		″		″		″	
Mag. 0.0–2.5	+0.017	18 stars	+0.100	2 stars	+0.113	3 stars	——	0 stars	+0.200	2 stars
" 3.0–5.0	+0.026	9 "	+0.024	7 "	+0.114	5 "	+0.095	10 "	+0.183	7 "
" 5.1–7.0	−0.010	7 "	+0.036	17 "	+0.059	19 "	+0.041	18 "	+0.085	15 "
" 7.1–9.0	——	0 "	+0.035	31 "	+0.033	26 "	+0.024	27 "	+0.119	15 "

As remarked with respect to similar tables previously given by us, the above table, comprising an increased number of stars, although the number is still not very large, shows in a very convincing manner a relation between proper motion, magnitude and parallax conforming to what one might reasonably expect. To a certain degree it thereby confirms the evidence furnished by a considerable number of duplicate series and the comparison of our results with the best obtained by other observers, notably those of SCHLESINGER, that on the whole the work is not affected by any very appreciable systematic error.

Transactions of the Astronomical Observatory of Yale University.

RESEARCHES WITH THE HELIOMETER.

CATALOGUE

OF

YALE PARALLAX RESULTS.

BY

WILLIAM L. ELKIN, Director Emeritus,
FREDERICK L. CHASE, Acting Director,
MASON F. SMITH, Assistant.

CATALOGUE

OF

YALE PARALLAX RESULTS.

As a conclusion to this volume it has seemed to us that it might be desirable to have all the parallax results thus far determined at the Yale Observatory assembled in one catalogue, containing references to the pages upon which all the data for each star are given, which would make it also serve as a fairly complete index. Besides the convenience thus afforded there are several other reasons for such a catalogue. A considerable number of the stars are found in more than one of our partial lists of collected results, having been further investigated or revised. Moreover considerable data have been collected since the earlier results were published, which make it possible now to form a more correct idea of the limit of possible systematic error. Our knowledge of its magnitude was very uncertain for the list of 163 stars, viz. our second and largest list. Then too the proper motions and spectral types given in our three earlier lists nearly all require correction to make them conform to the latest values in PORTER's catalogues and the Revised Harvard Photometry. Professor PICKERING has very kindly furnished us with required data from unpublished determinations. We wish also to include the results of the series on three Pleiades stars and the two comparison stars *e* and *f* for Weisse 17^h, 322, for the significance of which reference should be made to the discussion of those particular stars.

We have retained only the Bonn Durchmusterung estimates for magnitude, since but a limited number of the stars investigated by us, or used as comparison stars are given in the Harvard and Potsdam catalogues. We give also the average magnitudes of the comparison stars employed.

In the probable errors we have made no change in the assumed systematic error, viz. $\pm 0.''030$ for ELKIN's results for the ten first magnitude stars except α Bootis, nor for those of the next list which were observed prior to 1901, except for β Persei, Nova Persei and β Cygni, where the observations were both larger in number and followed in

consecutive epochs. For these three stars and those taken up since 1901, where the observations were continuous, where greater precaution was taken in adopting the smallest possible arc of "swinging through" and also a more consistent use of screens, and where the longer experience of the observers counted for something, we have derived the probable errors in the manner described on pages 215–216, assuming however the above large systematic error, which would give for Method α the value $\pm 0.''037$. For Method β we take the average probable error of one observation, which was $\pm 0.''146$ for CHASE and $\pm 0.''142$ for SMITH, divided by the square root of the weight, and for Method γ the probable error which comes out from the solution. We believe the mean of these to be a generous estimate of the probable errors of our results.

For the seven stars with but a single comparison star the probable errors are based on a change of $0.''145$ to $0.''122$ for Class IV in the table given on page 193, which results from the revision of Lalande 43492 on page 295.

The probable errors of the third list, 35 Selected Stars, remain unchanged except for Lalande 43492, and B. D. + 58°, 2605. For the former the systematic error was inadvertently omitted and the latter star was further investigated. Naturally for all the cases further investigated or revised the values have been taken from the last list in which they appear. The probable errors for the 41 Southern Stars are incorporated in the final catalogue without change, and those for the five added stars have been determined by the methods used in the last two lists. As hitherto we have given the directly derived relative parallax only, leaving the question of the parallaxes of the comparison stars out of consideration.

Following this catalogue we give in a supplementary table, for the sake of comparison, the parallax results obtained by other authorities which have seemed to us to possess some degree of reliability or historical interest, and in this an attempt has been made to approximate chronological order.

Catalogue of Yale Parallax Results.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0	Decl. 1900.0	Proper Motion. R. A.	Proper Motion. Decl.	l. Tota	Parallax.	Prob. Error.	Observer.	No. Obs.
						h m	° ′	s	″	″	″	″		
II	10	Lalande 47231	8.3	6.8	K2	0 0.4	+45 16	+0.083	−0.13	0.89	+0.13	±0.050	Chase	11
II	11	Bradley 3212	7.5	8.2	Ko	1.4	+28 28	+0.028	−0.18	0.41	+0.14	±0.027	Smith	12
II	296–297	β Cassiopeiae	2.2	8.1	F5	3.8	+58 36	+0.066	−0.19	0.55	+0.051	±0.015	Smith	22
II	259–262	Groombridge 34	8.1	7.9	Ma	12.7	+43 27	+0.259	+0.39	2.85	+0.306	±0.008	Chase	48
II	12	Piazzi 0h, 137	7.5	7.7	Go	34.0	+ 2 35	+0.049	+0.31	0.79	+0.01	±0.040	Chase	12
II	13–16 294–295	54 Piscium	6.2	7.5	Ko	34.2	+20 43	−0.034	−0.37	0.61	+0.131	±0.014	Chase	56
II	17	Lalande 1045	7.0	7.7	Ko	35.3	+39 39	+0.031	−0.70	0.79	+0.01	±0.046	Chase	12
II	18	Lalande 1198	8.2	7.8	Ko	40.0	+ 1 15	−0.004	−0.61	0.61	+0.07	±0.076	Chase	11
II	19	Mayer 20	6.0	8.1	G5	43.1	+ 4 46	+0.050	−1.13	1.36	+0.16	±0.048	Chase	12
II	20	Groombridge 145	7.8	6.9	Ko	43.3	+69 54	+0.071	+0.22	0.43	+0.02	±0.038	Chase	12
II	21	Lalande 1799	8.3	7.4	Ko	57.2	+ 4 31	+0.029	+0.25	0.50	+0.05	±0.050	Chase	12
II	22	Lalande 1964	8.4	8.1	K2	1 2.2	+22 26	+0.007	−0.50	0.51	+0.09	±0.050	Chase	11
II	23	Lalande 1966	7.8	7.0	F5	3.3	+61 1	+0.086	0.00	0.63	+0.07	±0.037	Chase	12
II	334	Weisse 1h, 161	8.0	6.5	Ko	13.5	− 1 23	+0.028	−0.26	0.49	−0.020	±0.020	Chase	16
II	335	Lalande 2387	8.5	7.5	G	14.0	− 9 27	−0.021	−0.50	0.59	+0.016	±0.020	Chase	14
II	24	Lalande 2450	7.9	8.8	F8	16.9	+18 10	+0.036	+0.01	0.51	+0.01	±0.035	Chase	12
II	298–299	Lalande 2682	7.8	7.8	G5	23.6	+21 13	+0.031	−0.18	0.47	+0.000	±0.020	Smith	24
II	299–300	Lalande 3022	7.8	7.4	G5	33.9	+27 36	+0.036	+0.15	0.50	+0.037	±0.017	Smith	24
II	25	Fedorenko 263	7.4	7.9	G5	34.2	+66 25	+0.118	−0.25	0.75	+0.03	±0.029	Elkin Smith	3 10
II	26	41 Hev. Andromedae	5.3	8.4	F8	35.7	+42 7	+0.071	−0.13	0.80	+0.11	±0.027	Smith	14
II	27–28	107 Piscium	5.3	8.2	G5	37.1	+19 47	−0.021	−0.67	0.73	+0.12	±0.034	Elkin Smith	17 13
II	29	Piazzi 1h, 159	6.1	6.0	G5	40.5	+63 22	+0.087	−0.25	0.64	+0.05	±0.029	Elkin Smith	3 10
II	263–266 278	γ1 Andromedae	2.0	7.4	Comp.	57.8	+41 51	+0.005	−0.05	0.07	+0.002	±0.009	Chase	56
II	336	Lalande 3922–3	7.5	8.6	Go	2 2.5	− 1 5	−0.024	−0.36	0.51	−0.048	±0.020	Chase	14
II	30	Bradley 3227	7.8	7.3	Ko	7.5	+67 13	+0.082	−0.30	0.57	+0.09	±0.030	Elkin Smith	3 10
II	337	Weisse 2h, 95	8.3	8.8	G	9.5	− 1 40	+0.065	−0.08	0.97	+0.008	±0.022	Chase	14
II	31	Lalande 4141	6.5	6.7	Go	9.7	+23 49	+0.041	−0.17	0.59	+0.02	±0.033	Smith	12
II	32	δ Trianguli	5.0	7.0	Go	10.9	+33 46	+0.092	−0.23	1.17	+0.12	±0.032	Smith	13
II	33–34	Piazzi 2h, 123	6.5	8.1	Ko	30.6	+ 6 25	+0.121	+1.47	2.32	+0.14	±0.028	Elkin Smith	16 13
II	35	Lalande 4855	7.3	6.9	Go	32.6	+30 24	−0.034	−0.41	0.60	+0.01	±0.031	Smith	12
II	300–301	γ2 Ceti	3.5	8.1	Ao	38.1	+ 2 49	−0.011	−0.16	0.23	+0.119	±0.017	Smith	24
II	302–303	Weisse 2h, 927	8.2	7.6	G	55.2	+ 5 36	+0.044	−0.15	0.68	+0.088	±0.015	Smith	24

Catalogue of Yale Parallax Results—Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h m	Decl. ° ′	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	36	Lalande 5490–6	6.7	7.9	G5	2 56.0	+61 20	+0.101	−0.69	1.00	+0.05	±0.030	Chase	12
II	37–38	β Persei	Var.	7.7	B8	3 1.7	+40 34	−0.002	+0.01	0.02	+0.037	±0.025	Chase	25½
II	39	ι Persei	4.3	8.0	Go	1.8	+49 14	+0.127	−0.06	1.25	+0.11	±0.027	Chase	12
II	40	Lalande 5761	7.9	6.9	F2	2.5	+25 58	−0.014	−0.86	0.88	−0.00	±0.032	Chase	12
II	41	Weisse 3h, 113	7.8	7.2	G	9.4	+ 8 37	+0.030	−0.40	0.60	+0.07	±0.039	Chase	12
II	338	Lalande 6320	7.9	8.3	K5	20.1	− 5 42	−0.019	−0.80	0.85	+0.061	±0.016	Smith	16
II	42	Nova Persei	Var.	7.8	Pec.	24.4	+43 34				−0.012	±0.023	Chase	21
II	339	ε Eridani	3.3	8.6	Kp	28.2	− 9 48	−0.067	+0.01	0.99	+0.307	±0.014	Smith	16
II	43	10 Tauri	4.2	8.2	G5	31.8	+ 0 5	−0.016	−0.50	0.55	+0.06	±0.029	Chase	12
II	340	Weisse 3h, 617	7.2	8.5	F8	35.3	− 3 32	+0.050	−0.23	0.78	−0.080	±0.015	Smith	16
II	341	δ Eridani	3.3	8.4	Ko	38.5	−10 6	−0.008	+0.74	0.75	+0.181	±0.015	Smith	16
II	44	Lalande 6888–9 pr.	8.2	7.6	G5	40.2	+41 9	+0.051	−1.23	1.36	+0.04	±0.025	Chase	13
II	315–317	Pleiades Star 36 E.	7.9	7.9		41.4	+23 25				−0.000	±0.015	Smith	38
II	317–318	Pleiades Star 43 E.	8.0	7.9		41.5	+23 22				−0.032	±0.014	Smith	40
II	319–320	Pleiades Star 46 E.	8.2	7.9		41.7	+23 18				+0.058	±0.016	Smith	38
II	45	Groombridge 745	8.2	7.8	K	48.4	+75 53	+0.096	−0.55	0.65	+0.04	±0.025	Chase	12
II	46	Lalande 7443	8.5	6.6	G	56.5	+35 2	+0.141	−1.36	2.20	+0.04	±0.026	Chase	12
I	262–263, 270–279, 328	α Tauri	1.1	7.6	K5	4 30.2	+16 19	+0.004	−0.19	0.20	+0.109	±0.014	Elkin	171
II	47	Groombridge 864	7.1	7.5	Go	34.5	+41 56	+0.050	−0.43	0.71	+0.02	±0.028	Elkin Chase	3 12
II	48	Groombridge 884	6.5	6.6	F8	44.4	+45 41	+0.034	−0.56	0.67	+0.12	±0.025	Elkin Chase	3 12
II	342	Weisse 4h, 1189	6.3	8.0	Ko	55.9	− 5 52	+0.040	−1.10	1.25	+0.104	±0.015	Smith	16
II	49	104 m Tauri	5.2	8.0	G	5 1.5	+18 31	+0.036	+0.02	0.51	+0.01	±0.047	Chase	12
I	263, 280–283, 328	α Aurigae	1.0	7.6	Go	9.3	+45 54	+0.005	−0.42	0.44	+0.079	±0.021	Elkin	67
II	50	λ Aurigae	4.9	8.1	Go	12.1	+40 1	+0.045	−0.66	0.84	+0.11	±0.041	Chase	13
II	343	Lalande 9960–1	8.5	7.8	Ko	14.1	− 3 11	+0.045	+0.13	0.68	+0.067	±0.015	Smith	16
II	266–268, 279	γ Orionis	2.0	8.6	B2	19.8	+ 6 16	−0.000	−0.02	0.02	−0.010	±0.011	Chase	44
II	344	Lalande 10299	8.5	7.5	Ko	23.5	− 3 34	−0.020	−0.82	0.87	+0.093	±0.014	Smith	16
II	345	δ Orionis	Var.	7.7	Bo	26.9	− 0 22	0.000	−0.00	0.00	−0.076	±0.014	Smith	16
II	51	Groombridge 990	7.9	6.9	Ko	30.4	+51 23	−0.059	+0.09	0.56	+0.02	±0.037	Chase	12
II	346	ε Orionis	2.0	7.9	Bo	31.1	− 1 16	+0.000	−0.00	0.00	−0.024	±0.018	Chase	16
II	52	Piazzi 5h, 146	6.3	8.2	Ko	33.2	+53 26	−0.002	−0.54	0.54	+0.13	±0.042	Chase	12
II	347	ζ Orionis	2	8.5	Bo	35.7	− 2 0	+0.000	−0.01	0.01	−0.020	±0.018	Chase	16

Catalogue of Yale Parallax Results — Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h	R. A. 1900.0 m	Decl. 1900.0 °	Decl. 1900.0 ′	Proper Motion. R. A. s	Proper Motion. Decl. ″	Proper Motion. Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	53	Lalande 10797–8	7.1	6.4	Go	5	39.2	+37	15	+0.039	−0.50	0.68	+0.07	±0.037	Chase	13
II	348	κ Orionis	2.5	8.2	Bo		43.0	− 9	42	+0.000	−0.00	0.00	+0.023	±0.019	Chase	16
I	263–264, 284–286, 328	α Orionis	Var.	8.2	Ma		49.7	+ 7	23	+0.001	+0.02	0.02	+0.024	±0.024	Elkin	48
II	54	Lalande 11196 pr.	7.0	7.8	G5		50.3	+13	55	+0.031	−0.50	0.67	+0.05	±0.043	Chase	12
II	55	23 Hev. Camelopardi	5.5	8.1	F8	6	29.2	+79	40	−0.025	−0.66	0.66	+0.03	±0.025	Chase	17
II	349	Lalande 13284–5	6.9	8.2	Ko		47.4	− 5	3	−0.038	+0.03	0.57	+0.114	±0.018	Chase	16
II	56	Weisse $6^h_{\frac{1}{2}}$, 1500	8.0	8.5	Go		51.4	+ 1	18	+0.006	−0.56	0.57	+0.00	±0.046	Chase	12
II	57	Lalande 13427	8.2	7.6	G5		54.0	+48	32	+0.056	−0.39	0.68	+0.01	±0.050	Chase	12
II	58	Piazzi 6^h, 305	6.3	7.9	F8		57.2	+29	30	+0.012	−0.80	0.82	+0.09	±0.044	Chase	12
II	59	Lalande 13849	7.0	8.2	G5	7	4.2	+21	25	−0.013	−0.48	0.51	+0.10	±0.047	Chase	12
II	350	Lalande 14146	7.3	7.7	Go		11.3	−12	53	−0.037	+0.16	0.56	+0.072	±0.020	Chase	17
II	269–270, 279	α_2 Geminorum	1.7	7.6	A		28.2	+32	7	−0.014	−0.08	0.20	+0.022	±0.012	Smith	40
I	264–265, 287–293, 328	α Canis Minoris	1.0	7.8	F5		34.1	+ 5	29	−0.047	−1.03	1.25	+0.334	±0.015	Elkin	128
I	265, 294–296, 328	β Geminorum	1.3	7.8	Ko		39.2	+28	16	−0.048	−0.05	0.63	+0.056	±0.023	Elkin	48
II	60	28 Hev. Camelopardi	6.5	7.4	G5		39.8	+80	31	−0.200	+0.02	0.49	−0.01	±0.029	Chase	16
II	61	Lalande 15290	8.2	8.4	G		47.2	+30	55	+0.055	−1.82	1.95	+0.08	±0.046	Chase	12
II	62	Lalande 15547	8.5	7.1	F8		53.7	+21	8	+0.012	−0.54	0.57	+0.08	±0.047	Chase	14
II	63	Lalande 15565	7.5	7.7	Go		54.3	+29	31	−0.013	−1.15	1.16	+0.03	±0.042	Chase	12
II	64	Piazzi 7^h, 321	6.7	7.8	G5	8	5.4	+32	46	−0.039	−0.65	0.81	+0.04	±0.042	Chase	12
II	65	Weisse 8^h, 181–2	8.3	8.0	K		12.0	+30	56	−0.026	−0.84	0.90	−0.03	±0.047	Chase	12
II	351	Lalande 16304	6.3	7.7	Go		13.7	−12	18	+0.017	−0.98	1.01	+0.095	±0.017	Chase	16
II	66	Lalande 16904	8.1	7.8	G5		33.1	+56	2	−0.035	−0.37	0.47	−0.05	±0.029	Elkin Smith	3 13
II	67	Lalande 17161	8.2	8.4	G		38.6	+42	3	−0.026	−0.59	0.66	−0.08	±0.048	Chase	12
II	68	55 ρ Cancri	6.0	6.2	Ko		46.6	+28	43	−0.038	−0.23	0.55	+0.06	±0.038	Chase	12
II	69	ι Ursae Majoris	3.1	7.2	A5		52.4	+48	26	−0.044	−0.25	0.51	+0.03	±0.032	Elkin Smith	3 13
II	70	10 Ursae Majoris	4.1	7.8	F5		54.2	+42	11	−0.040	−0.26	0.51	+0.08	±0.045	Chase	12
II	71	81 π^1 Cancri	7.0	6.6	G	9	6.8	+15	24	−0.038	+0.24	0.60	−0.02	±0.042	Chase	11
II	72	Lalande 18286	7.0	8.0	G5		12.0	+29	0	+0.005	−0.50	0.50	+0.00	±0.039	Chase	11
II	73	Lalande 18397	7.5	8.2	G5		16.1	+40	38	−0.034	−0.39	0.55	+0.05	±0.044	Chase	12
II	352–353	α Hydrae	2	7.6	K2		22.7	− 8	14	−0.001	+0.03	0.03	+0.008	±0.017	Chase	25
II	74	d Ursae Majoris	5.2	7.5	Go		25.6	+70	16	−0.012	+0.08	0.10	+0.04	±0.029	Chase	10

Catalogue of Yale Parallax Results— Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h	m	Decl. °	′	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	75	11 Leonis Minoris	5.5	6.9	Ko	9	29.7	+36	16	−0.060	−0.25	0.77	−0.02	±0.039	Chase	12
II	76	Lalande 19229	8.2	6.0	F		43.5	+14	14	+0.024	−0.72	0.80	−0.06	±0.049	Chase	12
II	77	Groombridge 1596	8.2	8.1	G5		54.9	+56	5	−0.026	−0.44	0.49	+0.06	±0.050	Chase	11
I	265–266, 297–301, 328	α Leonis	1.3	8.0	B8	10	3.0	+12	27	−0.018	+0.02	0.26	+0.024	±0.020	Elkin	74
II	78	Lalande 19821	8.3	7.5	G5		6.3	+24	15	−0.032	+0.09	0.45	+0.04	±0.024	Elkin Smith	3 11
II	79, 280–281	Lalande 19896	7.8	7.9	G5		8.9	+ 3	39	+0.014	−0.38	0.43	−0.058	±0.016	Elkin Smith	3 33
II	80	39 Leonis	6.5	7.4	F5		11.7	+23	36	−0.031	−0.10	0.44	+0.08	±0.029	Elkin Smith	3 11
II	271–273, 279	γ Leonis	2.0	7.6	Ko		14.5	+20	21	+0.021	−0.15	0.33	−0.046	±0.013	Smith	49
II	81	μ Ursae Majoris	3.1	7.1	K5		16.4	+42	0	−0.008	+0.03	0.09	+0.04	±0.027	Chase	15
II	353–354	Weisse 10h, 520	5.7	8.4	F5		31.6	−11	42	+0.016	−0.63	0.67	+0.008	±0.020	Chase	16
II	82	Lalande 20881	7.9	8.5	F5		46.1	+20	49	−0.019	−0.42	0.50	−0.00	±0.046	Chase	15
II	83	Groombridge 1697	6.0	8.1	G5		46.7	+70	23	−0.084	−0.08	0.43	−0.02	±0.028	Chase	14
II	84	Lalande 21008–10	8.3	7.1	Go		50.9	+28	17	−0.036	−0.10	0.49	+0.04	±0.055	Chase	11
II	256–259	Lalande 21185	7.3	7.9	Ma		57.9	+36	39	−0.046	−4.70	4.73	+0.392	±0.009	Chase	63
II	85	51 Leonis Minoris	7.8	8.2	Go		59.9	+25	45	−0.033	−0.07	0.46	+0.03	±0.051	Chase	12
II	86	Lalande 21368	8.5	8.2	K5	11	5.6	+31	0	+0.040	−0.19	0.55	+0.04	±0.029	Elkin Chase	3 12
II	87	Groombridge 1757	6.0	8.1	Ko		11.1	+50	1	−0.009	−0.01	0.09	−0.09	±0.032	Chase	10
II	88	ξ Ursae Majoris	3.7	8.0	Go		12.8	+32	6	−0.037	−0.57	0.74	+0.17	±0.032	Elkin Chase	3 12
II	354–355	Piazzi 11h, 32	7.2	8.6	K		13.2	− 4	31	+0.050	−0.12	0.76	−0.000	±0.021	Chase	16
II	89	83 Leonis pr.	7.5	7.7	Ko		21.7	+ 3	33	−0.051	+0.18	0.78	−0.04	±0.043	Chase	12
II	90	β Leonis	2.0	8.2	A2		44.0	+15	8	−0.036	−0.10	0.53	+0.12	±0.043	Chase	13
II	91	β Virginis	3.3	8.4	F8		45.5	+ 2	20	+0.048	−0.26	0.77	+0.11	±0.047	Chase	12
II	244–254	Groombridge 1830	6.5	7.6	Gp		47.2	+38	27	+0.341	−5.78	7.03	+0.073	±0.009	Smith Chase	50 75
II	356	Lalande 22585	6.4	8.0	G5		55.6	− 9	53	+0.009	−0.45	0.47	+0.111	±0.015	Smith	16
II	357	Lalande 22701	8.4	8.6	G	12	0.1	− 0	57	−0.035	+0.05	0.53	+0.104	±0.016	Smith	16
II	358	Weisse 12h, 69	7.3	8.4	Go		7.4	− 2	32	−0.040	+0.43	0.74	−0.010	±0.020	Chase	16
II	92	Lalande 22908	8.0	8.1	G		8.1	+11	24	+0.000	−0.56	0.56	+0.08	±0.046	Chase	11
II	359	Lalande 22954–68	6.2	8.6	F5		10.0	− 9	44	+0.003	−0.98	0.98	+0.030	±0.019	Chase	16
II	360	Lalande 23361	8.5	8.5	Go		24.6	− 2	46	−0.023	−0.66	0.74	+0.089	±0.015	Smith	16
II	93	8 Canum Venat.	4.5	6.7	Go		29.0	+41	54	−0.065	+0.29	0.78	+0.09	±0.031	Elkin Chase	3 12
II	94, 282–283	33 Virginis	6.4	8.1	Ko		41.3	+10	6	+0.018	−0.44	0.51	−0.010	±0.016	Chase	42
II	95	Lalande 23917	8.2	7.5	F8		44.6	+ 1	45	−0.004	−0.67	0.67	+0.01	±0.049	Chase	12

Catalogue of Yale Parallax Results — Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h	m	Decl. °	″	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	96	δ Virginis	3.0	7.6	Ma	12	50.6	+ 3	56	−0.034	−0.05	0.51	−0.04	±0.027	Chase	12
II	361	Lalande 24168	7.7	8.9	Go		53.9	− 9	18	−0.058	+0.18	0.88	−0.021	±0.022	Chase	16
II	362	Weisse 12h, 920	8.5	8.4	Go		56.2	− 7	54	−0.036	−0.13	0.55	+0.004	±0.015	Smith	16
II	97	Lalande 24414–16	6.8	8.6	Go	13	3.8	+ 5	46	+0.004	−0.68	0.68	−0.00	±0.048	Chase	12
II	98	Lalande 24504	8.5	8.6	G		6.4	+10	9	−0.034	+0.31	0.59	+0.02	±0.051	Chase	11
II	99	43 Comae Berenices	5.0	8.4	Go		7.2	+28	23	−0.060	+0.90	1.20	+0.12	±0.052	Chase	11
II	100	Weisse 13h, 241	9.0	7.3	K		14.9	+35	39	+0.032	−0.81	0.90	+0.07	±0.052	Chase	12
II	101	Weisse 13h, 216	8.5	7.8	G5		15.7	+ 4	39	−0.036	+0.25	0.60	−0.03	±0.033	Chase	10
II	102	Lalande 24774	8.0	7.7	Ko		16.1	+43	38	−0.044	−0.05	0.48	+0.17	±0.055	Chase	11
II	273–276, 279	ζ1 Ursae Majoris	2.0	7.4	Ap		19.9	+55	27	+0.015	−0.03	0.13	+0.007	±0.011	Smith	48
II	103	70 Virginis	5.5	8.2	G5		23.5	+14	19	−0.018	−0.57	0.63	+0.14	±0.049	Elkin	11
II	363	Piazzi 13h, 114	7.5	8.2	G		26.6	− 1	49	−0.060	+0.27	0.94	+0.046	±0.018	Chase	16
II	104	Lalande 25372	8.5	7.9	K		40.7	+15	26	+0.124	−1.44	2.30	+0.17	±0.055	Elkin	11
II	105	τ Bootis	4.6	7.7	F5		42.5	+17	57	−0.035	+0.04	0.50	+0.03	±0.055	Elkin	11
I, II	266, 307–308, 328, 216–236	α Bootis	1.0	8.0	Ko	14	11.1	+19	42	−0.080	−1.98	2.29	+0.066	±0.006	Elkin 126; Chase 154; Smith 123	
II	364	Lalande 26196	7.6	8.6	G5		14.4	− 4	41	−0.045	−0.09	0.68	+0.133	±0.015	Smith	16
II	106	Lalande 26289	6.5	8.3	Go		18.1	+ 1	43	+0.012	−0.47	0.50	−0.02	±0.035	Elkin 6; Smith 10	
II	365	Mayer 576	6.0	8.3	F5		31.7	−11	53	−0.061	+0.38	0.97	+0.043	±0.019	Chase	16
II	107	Fedorenko 2544	7.7	7.4	G5		52.3	+54	4	−0.112	+0.50	1.11	+0.07	±0.040	Chase	13
II	108	Lalande 27742	6.8	7.1	G	15	8.3	+19	39	−0.044	+0.31	0.69	+0.04	±0.041	Elkin 6; Smith 9	
II	366	Lalande 27744	7.0	7.5	Go		8.8	− 0	58	−0.086	−0.50	1.38	+0.072	±0.014	Smith	16
II	109, 284–286	5 Serpentis	5.0	8.7	Go		14.2	+ 2	9	+0.023	−0.52	0.62	+0.086	±0.014	Elkin 5; Smith 41	
II	110	Lalande 27958	8.0	7.0	Go		14.8	+26	4	−0.039	−0.09	0.53	+0.02	±0.039	Chase	13
II	111	Weisse 15h, 268	8.7	8.6	K5		17.7	+ 1	47	−0.028	−0.33	0.53	+0.11	±0.032	Chase	12
II	367	Lalande 28607	7.0	8.8	F5		37.7	−10	36	−0.079	−0.30	1.20	+0.027	±0.015	Smith	16
II	112	39 Serpentis	6.3	7.5	F5		48.5	+13	31	−0.012	−0.55	0.58	+0.03	±0.038	Chase	12
II	113	χ Herculis	4.3	7.9	Go		49.2	+42	44	+0.039	+0.62	0.75	+0.09	±0.029	Chase	12
II	114	γ Serpentis	3.8	7.9	F8		51.8	+15	59	+0.019	−1.29	1.32	+0.09	±0.043	Chase	12
II	115	ρ Coronae Borealis	5.7	7.1	F8		57.2	+33	36	−0.018	−0.78	0.81	+0.02	±0.045	Chase	12
II	116	Groombridge 2305	6.5	7.6	G5	16	1.5	+39	26	−0.050	+0.05	0.58	+0.06	±0.028	Chase	12
II	117	Lalande 29439	8.4	6.7	G5		2.9	+38	55	+0.018	−0.53	0.57	+0.04	±0.030	Chase	11½

Catalogue of Yale Parallax Results — Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h	m	Decl. °	′	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	118	Lalande 29437–8	6.5	7.7	G	16	4.3	+ 6	40	+0.016	−0.71	0.75	+0.00	±0.039	Chase	13
II	368	18 Scorpii	5.9	7.2	Go		10.2	− 8	6	+0.013	−0.50	0.53	+0.030	±0.015	Smith	16
II	303–304	Lalande 29917	8.6	8.0	K2		16.5	+67	29	−0.085	+0.10	0.50	+0.144	±0.017	Smith	24
II	119	Lalande 30024–6	7.0	8.0	G5		24.5	+18	37	−0.024	+0.40	0.53	+0.08	±0.044	Chase	12
II	120	Lalande 30044–5	7.6	8.0	Go		25.6	+ 4	26	−0.032	−1.37	1.45	+0.00	±0.064	Chase	12
II	304–305	Lalande 30271	7.2	7.4	Go		32.6	+31	10	+0.000	−0.46	0.46	+0.003	±0.016	Smith	24
II	121	ζ Herculis	3.0	7.9	Go		37.5	+31	47	−0.036	+0.41	0.62	+0.17	±0.030	Smith	12
II	122	Lalande 30699	7.6	8.3	G5		42.9	+68	16	−0.051	+0.43	0.51	+0.04	±0.028	Smith	12
II	123	Lalande 30694	7.0	8.5	G		47.9	+ 0	11	−0.049	−1.46	1.63	+0.13	±0.048	Chase	12
II	369	Weisse 16^h, 906	8.8	8.4	K		50.1	− 8	9	−0.063	−0.89	1.29	+0.210	±0.016	Smith	16
II	370	Lalande 31055	7.5	8.1	K5		59.8	− 4	54	−0.065	−1.13	1.49	+0.051	±0.014	Smith	16
II	124	Lalande 31132	6.6	7.9	G5		59.8	+47	12	+0.008	+0.85	0.85	+0.13	±0.028	Smith	12
II	287–288	Star *e* (W. 17^h, 322)	8.6	8.9		17	14.6	+ 2	40				−0.090	±0.026	Chase	12
II	125	72 w Herculis	5.7	8.0	Go		16.9	+32	36	+0.010	−1.04	1.05	+0.14	±0.027	Chase	12
II	126–130, 286–289	Weisse 17^h, 322	8.0	7.2	K5		20.8	+ 2	14	−0.041	−1.19	1.34	+0.134	±0.010	Chase	102
II	131	Fedorenko 2895	6.5	8.1	G5		25.3	+67	23	−0.095	+0.01	0.55	+0.04	±0.026	Chase	12
II	288	Star *f* (W. 17^h, 322)	7.2	8.2			26.5	+ 1	45				+0.032	±0.023	Chase	12
II	132	Weisse 17^h, 514	8.5	7.9	G		29.9	+ 6	4	−0.030	+0.37	0.58	−0.01	±0.050	Chase	10
II	276–279	α Ophiuchi	2.0	7.2	A5		30.3	+12	38	+0.008	−0.23	0.26	+0.066	±0.011	Smith	48
II	133	26 Draconis	6.0	7.8	F8		34.0	+61	57	+0.035	−0.51	0.57	+0.08	±0.027	Chase	12
II	134	μ Herculis	3.5	8.0	G5		42.5	+27	47	−0.024	−0.74	0.81	+0.12	±0.030	Chase	12
II	306–307	30 Draconis	5.0	8.0	A2		46.7	+50	48	−0.005	+0.20	0.21	+0.008	±0.015	Smith	24
II	307–308	Lalande 33439	6.7	8.2	G5	18	6.3	+38	27	−0.035	−0.50	0.65	+0.038	±0.017	Smith	24
II	371–372, 377	η Serpentis	3	7.8	Ko		16.1	− 2	55	−0.040	−0.68	0.91	+0.043	±0.013	Chase	32
II	135	χ Draconis	3.8	7.4	F8		22.9	+72	41	+0.113	−0.37	0.62	+0.11	±0.038	Chase	12
I	267, 309–316, 328	α Lyrae	1.0	7.6	Ao		33.6	+38	41	+0.017	+0.30	0.36	+0.082	±0.016	Elkin	133
II	308–309	Lalande 34986	8.1	6.9	Ko		43.8	+10	39	+0.009	−0.43	0.45	+0.074	±0.014	Smith	24
II	136	Groombridge 2789 pr.	6.2	6.3	G	19	9.5	+49	40	−0.018	+0.62	0.64	−0.03	±0.039	Chase	13
II	137	31 b Aquilae	5.5	6.8	G5		20.2	+11	44	+0.049	+0.65	0.97	+0.02	±0.037	Chase	14
II	138	Bradley 2459	6.1	7.0	F8		21.3	+24	44	−0.015	−0.62	0.65	+0.05	±0.038	Chase	12
II	139	β^1 Cygni	3.0	7.7	Comp.		26.7	+27	45	−0.002	−0.02	0.03	−0.027	±0.026	Chase	16
II	140	β^2 Cygni	6.5	7.7	B9		26.7	+27	45	−0.002	−0.02	0.03	−0.028	±0.027	Chase	16

Catalogue of Yale Parallax Results — Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h	R. A. 1900.0 m	Decl. 1900.0 °	Decl. 1900.0 ′	Proper Motion. R. A. s	Proper Motion. Decl. ″	Proper Motion. Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	141	Groombridge 2875	6.4	8.3	G5	19	29.5	+58	23	−0.065	−0.40	0.65	−0.06	±0.049	Chase	12
II	142	Lalande 37120–1	7.0	7.2	G		29.7	+32	59	−0.037	+0.23	0.52	+0.05	±0.039	Chase	11
II	254–255	σ Draconis	5.0	8.0	K0		32.5	+69	30	+0.105	−1.75	1.83	+0.243	±0.018	Smith	21
II	143	θ Cygni	4.9	8.0	F5		33.8	+49	59	−0.003	+0.24	0.24	+0.06	±0.024	Chase	14
II	144	Groombridge 2909	5.5	7.7	F0		37.7	+45	17	+0.009	+0.20	0.22	−0.01	±0.024	Chase	14
II	145–146	χ Cygni	5.4	7.9	F5		42.6	+33	30	−0.000	−0.44	0.44	+0.014	±0.022	Chase Smith	12 14
I	267 317–321 328	α Aquilae	1.2	7.6	A5		45.9	+ 8	36	+0.035	+0.38	0.64	+0.232	±0.019	Elkin	79
II	372	Lalande 38100	6.3	8.2	F8		54.4	−10	13	−0.022	−0.37	0.49	−0.013	±0.018	Chase	16
II	147	Lalande 38287	7.0	6.7	G		58.0	+15	20	−0.014	−0.56	0.59	+0.08	±0.038	Chase	12
II	148	Lalande 38380	6.0	8.1	G5		59.5	+29	38	+0.051	−0.52	0.84	+0.03	±0.042	Chase	12
II	149	15 Sagittae	5.5	7.0	G0		59.6	+16	48	−0.028	−0.40	0.57	+0.16	±0.066	Chase	12
II	150	Lalande 38383	7.0	7.0	G		59.7	+23	5	−0.076	−0.90	1.38	+0.10	±0.043	Chase	12
II	151	Groombridge 3042	5.9	8.2	F5	20	3.6	+52	52	+0.022	+0.24	0.31	+0.05	±0.026	Chase	14
II	152	Piazzi 20^h, 23	7.0	7.5	G5		6.6	+15	53	−0.030	+0.40	0.59	+0.07	±0.042	Chase	12
II	153	Groombridge 3150	6.2	7.1	F8		16.5	+66	32	+0.082	+0.29	0.57	+0.11	±0.025	Chase	12
II	154	γ Cygni	2.8	8.4	F8p		18.6	+39	56	−0.000	+0.02	0.02	+0.10	±0.026	Smith	14
II	155	Groombridge 3215	6.7	7.0	G5		29.3	+41	33	−0.016	+0.46	0.49	−0.02	±0.025	Chase	15
II	156	Lalande 39866	8.4	6.8	K		34.6	+ 4	37	+0.057	+0.07	0.85	+0.05	±0.047	Chase	12
I	268 322–324 328	α Cygni	1.7	7.1	A2p		38.0	+44	55	−0.001	+0.00	0.01	−0.012	±0.023	Elkin	49
II	157	Groombridge 3263	6.2	7.7	F5		38.2	+60	9	+0.000	+0.18	0.18	+0.01	±0.026	Chase	14
II	158	Fedorenko 3562–3	7.2	7.9	G		38.7	+75	14	+0.088	+0.52	0.62	+0.05	±0.026	Chase	12
II	159	6 Hev. Cephei	4.5	7.5	G0		42.9	+57	13	−0.012	−0.25	0.27	+0.00	±0.027	Chase	14
II	160	η Cephei	3.7	7.6	K0		43.3	+61	27	+0.012	+0.81	0.82	+0.09	±0.026	Smith	13
II	161	Fedorenko 3638	7.8	8.5	G5		52.4	+74	23	+0.102	+0.54	0.68	−0.02	±0.032	Chase	12
II	162 289–290	Weisse 20^h, 1454	8.2	7.7	F8		59.1	+ 2	36	−0.023	−0.40	0.52	−0.075	±0.013	Smith	28
II	163	Lalande 40844	8.8	8.2	K0	21	0.4	+ 6	41	+0.001	−0.53	0.53	+0.16	±0.054	Elkin	11
II	236–244	61$_1$ Cygni	5.0	7.5	K5		2.4	+38	15	+0.344	+3.23	5.18	+0.294	±0.008	Chase	115
		61$_2$ Cygni	5.3	7.5	K5								+0.288	±0.009	Chase	115
		mean											+0.291	±0.005	Chase	
II	164 290–292	Weisse 21^h, 97	7.3	7.8	F8		7.4	+17	21	−0.008	−0.90	0.91	−0.008	±0.016	Elkin Smith	11 22
II	165	ρ Cygni	4.1	8.0	K0		30.2	+45	9	−0.003	−0.10	0.11	+0.04	±0.025	Chase	14
II	166	72 Cygni	5.0	7.9	K0		30.7	+38	5	+0.010	+0.10	0.16	−0.03	±0.027	Chase	14

Catalogue of Yale Parallax Results — Continued.

Vol.	Page.	Star.	Mag. Star.	Mag. Comp.	Spect.	R. A. 1900.0 h	m	Decl. °	′	Proper Motion. R. A. s	Decl. ″	Total. ″	Parallax. ″	Prob. Error. ″	Observer.	No. Obs.
II	167	Lalande 42883–5	7.4	7.6	F5	21	54.3	+29	21	−0.031	−0.39	0.56	+0.02	±0.043	Chase	11
II	168	Groombridge 3689	7.9	8.0	G5	22	3.1	+52	39	−0.058	−0.33	0.62	+0.03	±0.037	Smith	10
II	310–311	ε Cephei	5.1	7.6	A5		11.3	+56	33	+0.054	+0.04	0.45	+0.110	±0.015	Smith	22
II	169, 295	Lalande 43492	7.0	7.5	Go		12.2	+12	24	+0.056	+0.08	0.82	−0.05	±0.057	Chase	11
II	170	31 Cephei	5.5	8.3	Fo		33.3	+73	7	+0.042	+0.02	0.18	−0.04	±0.031	Chase	13
II	171	Piazzi 22h, 214	7.2	7.4	G5		40.9	+29	56	−0.025	−0.35	0.48	−0.03	±0.038	Chase	12
II	172	ξ Pegasi	4.8	8.1	F5		41.7	+11	40	+0.013	−0.50	0.53	+0.08	±0.047	Chase	12
II	173	σ Pegasi	5.0	7.5	F5		47.3	+ 9	18	+0.034	+0.05	0.50	+0.01	±0.070	Chase	12
II	374	Lalande 45028	7.8	8.4	Ko		56.7	− 4	23	+0.029	−0.26	0.50	+0.038	±0.015	Smith	16
II	174	Fedorenko 4371	7.5	7.9	G	23	1.2	+67	52	+0.099	+0.15	0.58	+0.05	±0.049	Chase	10
II	375	Lalande 45292–4	8.2	7.8	Ko		4.0	− 2	48	+0.037	−0.10	0.56	+0.028	±0.015	Smith	16
II	376	Lalande 45456	9.0	8.2	F5		8.9	− 9	29	+0.036	−0.05	0.53	+0.013	±0.016	Smith	16
II	175	γ Piscium	3.8	8.1	Ko		12.0	+ 2	44	+0.049	+0.02	0.73	−0.05	±0.044	Chase	12
II	176	Piazzi 23h, 43	8.5	7.4	G5		13.8	+ 4	52	+0.032	−0.09	0.49	+0.01	±0.060	Elkin	12
II	177	Lalande 45755	7.3	7.4	F8		16.8	+43	33	+0.055	+0.23	0.64	+0.03	±0.037	Chase	12
II	311–313, 377–378	B. D. +58°, 2605	7.5	8.3	Ko		26.4	+58	37	+0.138	+0.08	1.08	+0.068	±0.012	Smith	48
II	313–314	B. D. +62°, 2244	7.3	7.2	G5		28.2	+62	36	+0.064	−0.00	0.44	−0.022	±0.016	Smith	22
II	178	λ Andromedae	3.5	8.1	Ko		32.7	+45	55	+0.016	−0.42	0.45	−0.02	±0.026	Smith	12
II	179	ι Piscium	4.2	8.3	Go		34.8	+ 5	5	+0.023	−0.44	0.56	+0.14	±0.059	Elkin	12
II	180	Piazzi 23h, 164	7.5	7.6	Go		38.5	+57	31	+0.045	+0.49	0.61	−0.09	±0.038	Chase	13
II	181, 292–294	Lalande 46650	8.7	8.4	Ma?		44.0	+ 1	52	+0.063	−0.96	1.34	+0.185	±0.016	Elkin, Smith	11, 34
II	182	85 Pegasi	6.1	7.5	Go		56.9	+26	33	+0.063	−0.97	1.29	+0.10	±0.045	Chase	11
II	183	Piazzi 23h, 267	6.3	7.7	Go		59.7	+34	6	+0.060	+0.10	0.76	−0.00	±0.043	Chase	12

The stars named below have also the following designations:—

Groombridge 34 = Lalande 248
Pleiades Star 36 E. = B. D. +23°, 535
Pleiades Star 43 E. = B. D. +23°, 539
Pleiades Star 46 E. = B. D. +23°, 542
Groombridge 864 = Lalande 8735
Groombridge 884 = Lalande 9012
Groombridge 1697 = Lalande 20849
Groombridge 2305 = Lalande 29381
Star *e* (W. 17h, 322) = B. D. +2°, 3295
Star *f* (W. 17h, 322) = B. D. +1°, 3450
Groombridge 2789 pr. = 6 B Cygni
Bradley 2459 = 3 Cygni
Groombridge 2909 = Lalande 37508
χ Cygni = 17 Cygni
Groombridge 3042 = Lalande 38626
Groombridge 3215 = Lalande 39704

Yale Parallax Results Compared with Other Authorities.

Star.	Parallax.		Authority.	Method.
	″	″		
β Cassiopeiae	+0.051	±0.015	Smith	H.
	+0.154	.018	Pritchard	P.
	+0.10	.029	Flint I	T.
	+0.082	.019	Russell	P.
Groombridge 34	+0.306	±0.008	Chase	H.
	+0.292	.025	Auwers	C.
	+0.31	.034	Flint I	T.
	+0.250	.016	Russell	P.
	+0.266	.010	Schlesinger	P.
Mayer 20	+0.16	±0.048	Chase	H.
	+0.14	.063	Flint I	T.
	+0.170	.040	Flint II	T.
δ Trianguli	+0.12	±0.032	Smith	H.
	+0.10	.043	Flint I	T.
	+0.103	.029	Flint II	T.
Piazzi 2^h, 123	+0.14	±0.028	Elkin, Smith	H.
	+0.11	.043	Flint I	T.
Lalande 4855	+0.01	±0.031	Smith	H.
	+0.029	.025	Flint II	T.
β Persei	+0.037	±0.025	Chase	H.
	+0.058	.018	Pritchard	P.
	+0.122	.026	Flint II	T.
	+0.007	.027	Russell	P.
ι Persei	+0.11	±0.027	Chase	H.
	+0.10	.033	Flint I	T.
Lalande 5761	−0.00	±0.032	Chase	H.
	+0.085	.022	Rambaut	P.
	+0.010	.020	Schlesinger	P.
Nova Persei	−0.012	±0.023	Chase	H.
	+0.03	.010	Bergstrand	P.
	+0.004	.004	Küstner	P.
ε Eridani	+0.307	±0.014	Smith	H.
	+0.364	.025	Flint II	T.
δ Eridani	+0.181	±0.015	Smith	H.
	+0.078	.034	Flint II	T.
Lalande 6888–9 pr.	+0.04	±0.025	Chase	H.
	−0.14	.040	Flint I	T.
	+0.057	.017	Von Zeipel	P.
	−0.004	.030	Russell	P.
	+0.10	.020	Rambaut	P.
Groombridge 745	+0.04	±0.025	Chase	H.
	+0.083	.024	Kapteyn, De Sitter	P.
Lalande 7443	+0.04	±0.026	Chase	H.
	−0.02	.055	Flint I	T.
	+0.039	.013	Schlesinger	P.
	−0.011	.014	Russell	P.
α Tauri	+0.109	±0.014	Elkin	H.
	+0.516	.057	O. Struve	F.
	+0.102	.030	Hall	F.
	+0.02	.058	Flint I	T.
	+0.079	.029	Kapteyn, De Sitter	P.
	−0.005	.020	Kapteyn, De Sitter	P.
Groombridge 864	+0.02	±0.028	Elkin, Chase	H.
	+0.024	.025	Flint II	T.
Groombridge 884	+0.12	±0.025	Elkin, Chase	H.
	+0.078	.019	Russell	P.
Weisse 4^h, 1189	+0.104	±0.015	Smith	H.
	+0.29	.042	Flint I	T.
α Aurigae	+0.079	±0.021	Elkin	H.
	+0.305	.043	O. Struve	F.
	+0.01	.035	Flint I	T.
λ Aurigae	+0.11	±0.041	Chase	H.
	+0.10	.021	Kostinsky	P.
	+0.070	.028	Flint II	T.
γ Orionis	−0.010	±0.011	Chase	H.
	+0.021	.031	Flint II	T.
δ Orionis	−0.076	±0.014	Smith	H.
	+0.072	.030	Flint II	T.
ε Orionis	−0.024	±0.018	Chase	H.
	+0.048	.025	Flint II	T.
Piazzi 5^h, 146	+0.13	±0.042	Chase	H.
	+0.09	.021	Kostinsky	P.
ζ Orionis	−0.020	±0.018	Chase	H.
	−0.039	.026	Flint II	T.
κ Orionis	+0.023	±0.019	Chase	H.
	+0.018	.030	Flint II	T.
23 Hev. Camelopardi	+0.03	±0.025	Chase	H.
	+0.127	.053	Strömberg	P.

Star.	Parallax.		Authority.	Method.
	″	″		
Lalande 13427	+0.01	±0.050	Chase	H.
	+0.049	.011	Schlesinger	P.
Piazzi 6^h, 305	+0.09	±0.044	Chase	H.
	+0.03	.028	Flint I	T.
α_2 Geminorum	+0.022	±0.012	Smith	H.
	−0.17	.041	Flint I	T.
	+0.07		Curtis	S.
pair	+0.103	.029	Russell	P.
pair	+0.167	.031	Flint II	T.
α Canis Minoris	+0.334	±0.015	Elkin	H.
	+0.240	.029	Auwers	H.
	+0.34	.039	Flint I	T.
Lalande 15290	+0.08	±0.046	Chase	H.
	+0.02	.014	Peter	H.
	−0.01	.030	Flint I	T.
	+0.072	.019	Schlesinger	P.
Lalande 15565	+0.03	±0.042	Chase	H.
	+0.07	.026	Flint I	T.
	+0.11	.032	Jost	T.
Piazzi 7^h, 321	+0.04	±0.042	Chase	H.
	+0.04	.024	Jost	T.
Weisse 8^h, 181–2	−0.03	±0.047	Chase	H.
	+0.081	.031	Flint II	T.
Lalande 16304	+0.095	±0.017	Chase	H.
	+0.12	.030	Flint I	T.
55 ρ Cancri	+0.06	±0.038	Chase	H.
	+0.09	.037	Jost	T.
ι Ursae Majoris	+0.03	±0.032	Elkin, Smith	H.
	+0.11	.059	Flint I	T.
10 Ursae Majoris	+0.08	±0.045	Chase	H.
	−0.07	.041	Flint I	T.
	−0.004	.027	Flint II	T.
Lalande 18286	+0.00	±0.039	Chase	H.
	+0.119	.026	Flint II	T.
α Hydrae	+0.008	±0.017	Chase	H.
	−0.030	.031	Flint II	T.
11 Leonis Minoris	−0.02	±0.039	Chase	H.
	+0.07	.042	Jost	T.

Star.	Parallax.		Authority.	Method.
	″	″		
α Leonis	+0.024	±0.020	Elkin	H.
	+0.170	.045	Kerschner	F.
γ Leonis	−0.046	±0.013	Smith	H.
	+0.020		Belopolsky	S.
	+0.096	.040	Flint II	T.
Weisse 10^h, 520	+0.008	±0.020	Chase	H.
	−0.036	.046	Flint II	T.
Lalande 21185	+0.392	±0.009	Chase	H.
	+0.501	.011	Winnecke	H.
	+0.428	.030	Kapteyn	P.
	+0.37	.047	Flint I	T.
	+0.36	.023	Jost	T.
	+0.344	.014	Russell	P.
ξ Ursae Majoris	+0.17	±0.032	Elkin, Chase	H.
	+0.160	.031	Flint II	T.
83 Leonis pr.	−0.04	±0.043	Chase	H.
pair	+0.052	.031	Russell	P.
β Leonis	+0.12	±0.043	Chase	H.
	+0.029	.019	Pritchard	P.
	+0.031	.037	Flint II	T.
Groombridge 1830	+0.072	±0.013	Smith	H.
	+0.074	.011	Chase	H.
	+0.168	.018	Schlüter-Döllen	H.
	+0.111	.019	Wichmann-Döllen	H.
	+0.034	.029	O. Struve	F.
	+0.023	.033	Johnson-Auwers	H.
	+0.097	.023	Brünnow	F.
	+0.139	.026	Kapteyn	T.
	−0.01	.055	Flint I	T.
	+0.08	.024	Jost	T.
	+0.100	.029	Russell	P.
Weisse 12^h, 69	−0.010	±0.020	Chase	H.
	+0.029	046	Flint II	T.
Lalande 22954–68	+0.030	±0.019	Chase	H.
	−0.08	.066	Flint I	T.
8 Canum Venat.	+0.09	±0.031	Elkin, Chase	H.
	+0.075	.036	Flint II	T.
Lalande 23917	+0.01	±0.049	Chase	H.
	+0.025	.018	Schlesinger	P.

Star.	Parallax.		Authority.	Method.
	″	″		
43 Comae Berenices	+0.12	±0.052	Chase	H.
	+0.11	.014	Peter	H.
	+0.08	.053	Flint I	T.
ζ_1 Ursae Majoris	+0.007	±0.011	Smith	H.
	+0.031	.010	Peter	H.
	+0.067	.033	Flint II	T.
Lalande 25372	+0.17	±0.055	Elkin	H.
	+0.43	.065	Flint I	T.
	+0.152	.007	Schlesinger	P.
	+0.221	.020	Russell	P.
α Bootis	+0.051	±0.013	Elkin	H.
	+0.085	.007	Chase	H.
	+0.050	.011	Smith	H.
	+0.138	.052	Johnson	H.
	+0.07	.049	Flint I	T.
Lalande 26196	+0.133	±0.015	Smith	H.
	+0.058	.044	Flint II	T.
Lalande 26289	−0.02	±0.035	Elkin, Smith	H.
	+0.221	.036	Flint II	T.
Fedorenko 2544 (Lalande 27298)	+0.07	±0.040	Chase	H.
	+0.08	.022	Peter	H.
	−0.04	.036	Flint I	T.
	+0.046	.015	Schlesinger	P.
Lalande 27742	+0.04	±0.041	Elkin, Smith	H.
pair	−0.058	.041	Russell	P.
Lalande 27744	+0.072	±0.014	Smith	H.
	+0.12	.031	Flint I	T.
Lalande 28607	+0.027	±0.015	Smith	H.
	+0.02	.035	Flint I	T.
γ Serpentis	+0.09	±0.043	Chase	H.
	+0.05	.028	Flint I	T.
	−0.081	.024	Russell	P.
Lalande 29439	+0.04	±0.030	Chase	H.
	−0.02	.023	Kapteyn, De Sitter	P.
Lalande 30044–5	+0.00	±0.064	Chase	H.
	+0.00	.032	Flint I	T.
ζ Herculis	+0.17	±0.030	Smith	H.
	+0.11		Lewis	S.
	+0.101	.024	Russell	P.
	+0.138	.029	Flint II	T.
Lalande 30694	+0.13	±0.048	Chase	H.
	+0.01	.036	Flint I	T.
Lalande 31055	+0.051	±0.014	Smith	H.
	+0.11	.030	Flint I	T.
72 w Herculis	+0.14	±0.027	Chase	H.
	+0.09	.041	Flint I	T.
Weisse 17^h, 322	+0.134	±0.010	Chase	H.
	+0.17	.055	Flint I	T.
	+0.14	.020	Schlesinger	P.
	+0.095	.016	Russell	P.
	+0.194	.027	Flint II	T.
α Ophiuchi	+0.066	±0.011	Smith	H.
	+0.118	.025	Flint II	T.
μ Herculis	+0.12	±0.030	Chase	H.
	+0.038	.036	Russell	P.
	+0.116	.022	Flint II	T.
α Lyrae	+0.082	±0.016	Elkin	H.
	+0.261	.025	W. Struve	F.
	+0.147	.009	O. Struve	F.
	+0.154	.046	Johnson	H.
	+0.214	.010	Brünnow	F.
	+0.131	.021	Brünnow	F.
	+0.134	.006	Hall	F.
	+0.10	.030	Flint I	T.
Groombridge 2789 pr. (6 B Cygni)	−0.03	±0.039	Chase	H.
	+0.05	.030	Kostinsky	P.
	−0.011	.049	Russell	P.
seq.	+0.482	.054	Ball	F.
	−0.021	.008	Hall	F.
	+0.064	.040	Neander	P.
	+0.04	.030	Kostinsky	P.
	+0.075	.063	Russell	P.
mean	+0.038	.021	Flint II	T.
31 b Aquilae	+0.02	±0.037	Chase	H.
	+0.06	.010	Peter	H.
	+0.01	.030	Flint I	T.
	+0.101	.022	Schlesinger	P.
Bradley 2459 (3 Cygni)	+0.05	±0.038	Chase	H.
	+0.07	.031	Jost	T.
	+0.038	.024	Flint II	T.
β^1 Cygni	−0.027	±0.026	Chase	H.
	+0.61	.03	Jacoby	P.

Star.	Parallax.		Authority.	Method.
	″	″		
σ Draconis	+0.243	±0.018	Smith	H.
	+0.251	.011	Brünnow	F.
	+0.17	.021	Flint I	T.
	+0.175	.010	Peter	H.
θ Cygni	+0.06	±0.024	Chase	H.
	+0.002	.026	Flint II	T.
α Aquilae	+0.232	±0.019	Elkin	H.
	+0.22	.047	Flint I	T.
	+0.071	.033	Flint II	T.
Lalande 38380	+0.03	±0.042	Chase	H.
	+0.070	.024	Flint II	T.
15 Sagittae	+0.16	±0.065	Chase	H.
	+0.076	.045	Jost	T.
Lalande 38383	+0.10	±0.043	Chase	H.
	−0.02	.028	Flint I	T.
γ Cygni	+0.10	±0.026	Smith	H.
	+0.102	.019	Pritchard	P.
	−0.003	.024	Flint II	T.
Groombridge 3215	−0.02	±0.025	Chase	H.
	+0.03	.044	Jost	T.
Lalande 39866	+0.05	±0.047	Chase	H.
	+0.067	.022	Schlesinger	P.
Fedorenko 3638	−0.02	±0.032	Chase	H.
	−0.037	.021	Flint II	T.
61 Cygni pr.	+0.294	±0.008	Chase	H.
seq.	+0.288	.009	Chase	H.
mean	+0.348	.010	Bessel	H.
mean	+0.402	.016	Johnson	H.
seq.	+0.506	.026	O. Struve	F.
mean	+0.559	.016	Auwers	H.
seq.	+0.433	.029	Sokoloff-Schweizer	F.
pr.	+0.465	.050	Ball	F.
seq.	+0.468	.032	Ball	F.
seq.	+0.270	.013	Hall	F.
seq.	+0.322	.021	Hall	F.
seq.	+0.201	.025	Hall	F.

Star.	Parallax.		Authority.	Method.
	″	″		
61 Cygni pr.	+0.433	±0.010	Pritchard	P.
seq.	+0.434	.009	Pritchard	P.
pr.	+0.405	.026	Wilsing	P.
seq.	+0.357	.017	Wilsing	P.
pr.	+0.360	.015	Davis	P.
seq.	+0.288	.031	Davis	P.
mean	+0.326	.035	Kapteyn-Donner	P.
seq.	+0.21	.029	Flint I	T.
mean	+0.293	.007	Bergstrand	P.
mean	+0.38	.015	Kostinsky	P.
pr.	+0.254	.026	Peter	H.
seq.	+0.290	.012	Peter	H.
mean	+0.32	.029	Jost	T.
pr.	+0.24	.05	Abetti	T.
seq.	+0.22	.05	Abetti	T.
pr.	+0.406	.024	Russell	P.
seq.	+0.361	.021	Russell	P.
Weisse 21^h, 97	−0.008	±0.016	Elkin, Smith	H.
	+0.062	.024	Flint II	T.
Lalande 42883–5	+0.02	±0.043	Chase	H.
	+0.080	.027	Flint II	T.
Groombridge 3689	+0.03	±0.037	Smith	H.
	+0.001	.028	Flint II	T.
	+0.041	.020	Schlesinger	P.
Lalande 43492	−0.05	±0.057	Chase	H.
	+0.010	.033	Flint II	T.
	+0.021	.023	Russell	P.
σ Pegasi	+0.01	±0.070	Chase	H.
	+0.051	.032	Flint II	T.
Lalande 45755	+0.03	±0.037	Chase	H.
	+0.037	.021	Russell	P.
Piazzi 23^h, 164	−0.09	±0.038	Chase	H.
	−0.030	.026	Flint II	T.
Lalande 46650	+0.185	±0.016	Elkin, Smith	H.
	+0.23	.092	Flint I	T.
	+0.211	.023	Russell	P.
	+0.151	.013	Schlesinger	P.
85 Pegasi	+0.10	±0.045	Chase	H.
	+0.054	.019	Brünnow	F.
	+0.03	.027	Flint I	T.

In the column headed "Method," H. denotes Heliometer, F. Filar Micrometer, C. Chronograph and Equatorial, T. Transit, P. Photograph, and S. Spectrograph.

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